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ABSTRACT

This report discusses several activities of the Industrial Education Information System project to establish a data base to determine number and types of industrial education programs and background on teachers. Chapter 1 contains a general description of activities. Chapter 2 is a review of literature relating to causes and results of position changes by industrial educators. Project methods and procedures are described in chapter 3. Chapter 4 reports results of a pilot study to identify all programs and personnel in two representative regions of Illinois and a study of teacher turnover in these regions. Chapter 5 presents results of a national telephone survey to state supervisors to study vocational-industrial teacher supply. A summary of the report and major conclusions are provided in chapter 6. These recommendations are made: (1) prepare graduates of teacher education programs to handle student problems effectively, (2) establish a mechanism to identify first- and second-year teachers statewide and provide for their continuing inservice education, (3) recruit for teacher education programs, (4) increase resources to programs, (5) increase income and benefits for teachers, (6) establish a statewide clearinghouse for vacancies and potential teachers, and (7) continue to develop the data base and to study factors related to teacher supply and demand. (YLB)

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# Industrial Education Programs and Personnel in Illinois Secondary Schools, A Pilot Study
## I.E.I.S. Report No. 1

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TABLE OF CONTENTS


| CHAPTER | | PAGE |
|---|---|---|
| 1. | INRODUCTION AND BACKGROUND | 1 |
| 2. | REVIEW OF THE LITERATURE | 6 |
| | Job Satisfaction/Dissatisfaction | 6 |
| | Industrial Education Teacher Supply and Demand | 9 |
| | Industrial Education Teacher Supply in Illinois | 18 |
| | Summary | 21 |
| 3. | METHODS AND PROCEDURES | 24 |
| | The Population | 25 |
| | Teacher Turnover Sample | 26 |
| | Data Collection | 26 |
| | Data Collection Instruments | 27 |
| 4. | INDUSTRIAL EDUCATION PROGRAMS, COURSE OFFERINGS, TEACHERS AND TEACHER TURNOVER | 33 |
| | Industrial Education Programs, Course Offerings, and Teachers | 33 |
| | Building/Attendance Centers | 34 |
| | Laboratories | 39 |
| | Vacancies | 42 |
| | Individual Industrial Education Teachers | 45 |
| | Age | 46 |
| | Industrial Arts and Vocational-Industrial Teachers | 46 |
| | Years of Industrial Education Teaching Experience and Years Teaching in the District | 47 |
| | Course Sections | 56 |
| | Courses | 56 |

CHAPTER PAGE

Junior High/Middle School . . . . . 59

High School . . . . . 59

Adult Education . . . . . 61

Teacher Turnover and Vacancies - 1979-1980 . . . . . 63

Building Vacancy Information . . . . . 63

Recruiting Methods . . . . . 70

Teacher Telephone Interview . . . . . 72

Demographic Characteristics of the Subjects . . . . . 73

Age . . . . . 73

Marital Status . . . . . 74

Years of Work and Teaching Experience . . . . . 74

Industrial Education Teaching Experience . . . . . 74

Teaching in Last School District . . . . . 75

Full-time Industrial Work Experience . . . . . 76

Industrial Education Teaching Specialty . . . . . 77

Current Employment . . . . . 78

Employment in Education . . . . . 79

Employment in Business and Industry . . . . . 79

Self-Employment . . . . . 80

Retirement . . . . . 81

Reasons for Changing Positions . . . . . 82

Gross Income Differential . . . . . 83

Changes Required to Attract Teachers Back to the Classroom . . . . . 86

Program Changes . . . . . 87

CHAPTER PAGE

5. VOCATIONAL-INDUSTRIAL TEACHERS: SUPPLY AND DEMAND . . . . . 89

Basis of Information . . . . . 92

Number of Vocational-Industrial Teachers . . . . . 92

Supply and Demand . . . . . 93

Fields of Shortage/Surplus . . . . . 94

Changes from 1979-80 to 1980-81 . . . . . 94

Reasons for the Shortage . . . . . 95

Reducing the Shortage . . . . . 95

Program Developments . . . . . 96

Summary . . . . . 96

6. SUMMARY . . . . . 98

The Population and Samples . . . . . 99

Industrial Education in Private/Parochial Schools . . . . 100

Teacher Turnover Sample . . . . . 100

Industrial Education Teacher Supply in Illinois . . . . . 101

Summary . . . . . 103

Industrial Education Programs and Personnel . . . . . 104

Industrial Education Programs . . . . . 104

Teachers per Attendance Center . . . . . 105

Teaching Assignments . . . . . 105

Courses Offered . . . . . 105

Laboratories . . . . . 106

Industrial Education Teacher Turnover . . . . . 108

Turnover in Industrial Arts and Vocational-Industrial Education . . . . . 109

Teachers' Age, Experience and Turnover . . . . . 109

CHAPTER PAGE

6. SUMMARY (Cont'd)

Teaching Specialty, Location and Turnover . . . . . 110

Sources of Replacement Teachers . . . . . 111

Employment of Teachers Who Left Teaching . . . . . 112

Plans to Stay in Teaching and Reasons for Leaving Teaching . . . . . 112

Planned Program Changes in the Future . . . . . 113

Conclusions . . . . . 114

Recommendations . . . . . 115

LIST OF TABLES AND FIGURES


| TABLE | | PAGE |
|---|---|---|
| 2.1 | Industrial Arts Teacher Supply and Demand by States | 11 |
| 2.2 | Number of B.S. in Industrial Education and Industrial Technology Graduates in Illinois by University and Year, 1973-1980 | 19 |
| 2.3 | First Job-Type of Employment by Current Type of Employment for Graduates of EIU, ISU, NIU, SIU, UI, WIU | 22 |
| 4.1 | Number of Districts, Number and Percent of Districts with Industrial Education Programs and Number of Industrial Education Teachers by Region and County | 35 |
| 4.2 | Districts and Attendance Centers With and Without Programs by District Organization and Region | 37 |
| 4.3 | Districts and Attendance Centers by Level, Number of Teachers and Type of District | 38 |
| 4.4 | Student Capacity of Labs and Frequency of that Capacity | 40 |
| 4.5 | Type of Labs by Level, Number and Percent | 41 |
| 4.6 | FTE Vacancies and Vacancies Not Filled by Teaching Specialty and Level | 43 |
| 4.7 | Vacancies Not Filled by Size of Program, Teaching Specialty and Level | 44 |
| 4.7A | Age of Industrial Education Teachers | 47 |
| 4.7B | Industrial Arts and Vocational Teachers by Region and County | 48 |
| 4.8 | Years Teaching in District by Type of District | 49 |
| 4.9 | Total Years Teaching Industrial Education by Type of District | 50 |
| 4.10 | Plans to Stay in Teaching | 53 |
| 4.11 | Primary Type of Certification | 54 |
| 4.12 | Number and Percent Time by Assignment for Industrial Education Teachers | 55 |
| 4.13 | Number and Percent of Most Commonly Reported Courses and Sections of Courses by Industrial Arts and Vocational Industrial Education | 58 |

| TABLE | | PAGE |
|---|---|---|
| 4.14 | Number and Percent of Courses and Sections by Level | 59 |
| 4.15 | Number of Most Frequently Reported Courses and Sections for Grades 7-9 | 59 |
| 4.16 | Number of Most Frequently Reported Industrial Arts and Vocational Industrial Courses and Sections for High Schools and AVC's | 60 |
| 4.17 | Number of Most Frequently Reported Courses and Sections for Adult Education | 62 |
| 4.18 | FTE Vacancies by Level and Specialty for Industrial Arts and Vocational Industrial Education | 65 |
| 4.19 | Changes for Industrial Arts and Vocational Industrial Education, Filled and Not Filled by Level | 66 |
| 4.20 | Number and Percent of Districts, Districts with Vacancies and Vacancies by Average Daily Attendance | 68 |
| 4.21 | Number of Districts and Number of Vacancies by Per Pupil Expenditure | 69 |
| 4.22 | Number of Teachers and Vacancies Per Attendance Center by Level | 70 |
| 4.23 | Frequency Distribution of Age at Time of Follow-up Interview | 73 |
| 4.24 | Frequency Distribution of Total Years Industrial Education Teaching Experience | 75 |
| 4.25 | Frequency Distribution of Years Teaching in Last District | 76 |
| 4.26 | Frequency Distribution of Years of Industrial Work Experience | 77 |
| 4.27 | Areas of Full-time Work Experience | 77 |
| 4.28 | Teaching Specialties for Industrial Arts and Vocational Industrial Education | 78 |
| 4.29 | Importance of Industrial Education Technical and Professional Training in Non-Educational Employment | 80 |
| 4.30 | Frequency Distribution of Gross Income Differential Between Income in 1978-79 and 1979-80 | 84 |
| 4.31 | Frequency Distribution of Income Increase by Those Remaining in Education | 85 |

TABLE PAGE

4.32 Frequency Distribution of Income Increase by Those Employed in Business and Industry . . . . . 86

5.1 Supply and Demand for Vocational-Industrial Teachers . . . . 91

6.1 Districts and Attendance Centers With and Without Industrial Education Programs . . . . . 104

6.2 Most Frequently Taught Courses and Sections by Level and Type . . . . . 107

FIGURE

1 Total Years Teaching Industrial Education . . . . . 51

2 Years Teaching in District . . . . . 52

# CHAPTER 1

## INTRODUCTION AND BACKGROUND

This report and the study upon which it is based are activities of the Industrial Education Information System (IEIS). The IEIS project is being conducted by the Unive sity of Illinois with support from the Illinois State Board of Education, Department of Adult, Vocational and Technical Education (DAVTE).

The IEIS project emerged from concerns of the Industrial Joint State Staff. The Industrial Joint State Staff is comprised of representatives of each of the seven state universities with industrial education teacher education programs and the Industrial Oriented Consultants of the Occupational Consultant Sections of DAVTE. During the spring of 1978, this Staff identified priority areas where research and developmental activities should be undertaken.

This Report contains sections pertaining to several activities of the IEIS project since it was initiated. Two previous Reports have been issued and 17 Directories of industrial education programs and personnel, one for each of the regions of the State outside the City of Chicago, have been published.

Six chapters are included in this Report:

Chapter 1 - Introduction and Background

This chapter contains a general description of IEIS activities.

Chapter 2 - Supply/Demand for Industrial Education Teachers

A brief review of reports from other studies concerning this topic and the graduates of certified teachers from universities in Illinois.

Chapter 3 - Methods and Procedures for IEIS Studies

Chapter 4 - Industrial Education Programs, Course Offerings, Teachers and Teacher Turnover (The Pilot Study)

This chapter contains two major parts: 1) the results of the identification of all programs and personnel in the two regions included in The Pilot Study and 2) a study of teacher turnover in these two regions during 1979-1980. The teacher turnover study was conducted by David R. Pontius.

Chapter 5 - Vocational Industrial Teachers: Supply and Demand

This chapter reports the results of a national telephone survey to state supervisors during the fall of 1980.

Chapter 6 - Summary

This chapter will also be printed separately as an Executive Summary.

One of the priority areas was the need to establish an on-going and functional base of information concerning the industrial education programs and teachers in the state. At that time the information available was inadequate for determining needs, planning or delivery of services to meet current or anticipated needs for program improvement.

With the advice and assistance of the Joint State Staff representatives, a proposal was developed, submitted to DAVTE and approved for funding. Two types of activities were initiated during the first year of the IEIS Project: 1) a follow-up of all B.S. degree graduates from the seven state universities who were certifiable to teach industrial education in the public schools of Illinois; 2) a pilot study in the Rockford and Peoria areas to determine the number, type and location of all industrial oriented teachers and programs.

The term industrial education is used in this report with a generic definition. The administrative unit and program title for this field differ among the seven universities. Some of the units are known as Industrial Technology or similar titles. Industrial Oriented programs is the generic title used by DAVTE to include Industrial Arts, Vocational Industrial Education and Technical Industrial Education. Law Enforcement and Firemanship training and programs are included in the DAVTE Industrial Oriented program area. Due to the nature of the programs in Illinois, it is often not possible to distinguish programs, courses, teacher preparation and other apsects on the basis of whether they are vocational industrial or industrial arts. Where distinctions can be made, they are cited.

The Industrial Joint State Staff group was concerned with the actual nature of the programs and offerings in industrial education in the public schools of the state. The Illinois State Board of Education collects some information concerning the programs and teachers on an annual basis. However, the data concerning both industrial arts and vocational industrial education are collapsed into a total of six categories and consequently a significant proportion of the total subject matter areas, or courses, taught by industrial education teachers are classified as "other." These aggregated data and other limitations of the standard data collection procedures were inadequate to provide a meaningful description of the types of programs, levels of offerings and nature of the subject matter or the laboratories provided in the various school districts of the state. It could not be determined whether the newly prepared industrial education teachers had the appropriate specialites to match the needs of the programs being offered in the field.

The university representatives were also concerned about mechanisms for determining needs for in-service education and for the delivery of those services. There exists no source or listing of schools which offer industrial oriented programs. Nor was there a way to identify which schools offered which programs or which instructors were teaching which specialty areas. Therefore, it was not possible to contact either schools or individuals in the field to determine their perceived in-service needs or to notify the appropriate people of in-service programs that were being offered by the various universities. These types of considerations led to the priorities that were identified by the Industrial Joint State Staff. One priority included the identification of the types of programs being offered in the various schools and the individual industrial education teachers teaching in those programs as well as the subject matter specialties being taught. With this type of data base it would then be possible to contact the appropriate people to determine in-service and program improvement needs and then to develop strategies for meeting those needs.

The university representatives also had another particular reason for conducting a follow-up study of their graduates. The Teacher Education Program Approval section of the Illinois State Board of Education initiated activities in 1976 to review and audit all Illinois teacher education programs for accreditation. One of the requirements of the standards for accreditation is that the institution conduct follow-ups of their graduates and employers of their graduates for the purposes of obtaining feedback information for program modification and improvement. Each of the universities had conducted some type of follow-up of their graduates; most had been of an informal nature. For purposes of the review and audit procedures of the teacher education approval and accreditation process, it was the concensus of the Industrial Joint State Staff representatives of the universities that a coordinated and comprehensive follow-up activity would be desirable. This follow-up activity would also provide the first comprehensive and definitive information concerning the actual supply of industrial education teachers emerging from the seven state universities which had industrial teacher education programs. Further, such a follow-up should give an indication of the proportion of students who actually enter teaching and the extent to which they remain in teaching as a profession.

The survey of all BS degree graduates from all seven universities in Illinois that prepare industrial education teachers has been completed. All graduates who completed their degrees from July 1, 1973 through June 30, 1978 were sent a Questionnaire in the spring of 1979. This follow-up survey was

conducted to determine the potential supply of industrial education teachers. A more detailed analysis was made of the results of follow-up of the BS graduates from the University of Illinois.

Results of these follow-up activities have been published in two previous reports. They are:

Tomlinson, R. M. B.S. Graduates in Industrial Education from the State Universities in Illinois: 1973-1978. IEIS Report No. 2. March, 1980.

Tomlinson, R. M. University of Illinois B.S. Graduates in Industrial Education: 1973-1978. IEIS Report No. 3. March, 1980.

The trends in production of certified industrial education teachers by the seven state universities is being monitored on a continuing basis.

The second primary activity initiated during the initial year of the IEIS Project was a Pilot Study to determine baseline information for all industrial education programs and teachers. The Pilot Study was used to develop instruments and procedures which could be used for establishing the statewide data base.

The further cooperation of the Illinois Industrial Education Association, (IIEA) the professional association for industrial education teachers, was sought. The IIEA had been highly supportive of the Project and were most helpful in carrying out the Pilot Study. The IIEA is organized with Roundtables to serve as the teachers and programs in various regions of the State.

For the Pilot Study two geographic regions of Illinois were selected, the Peoria and Rockford regions. These two regions included a wide range of types and sizes of schools and school districts. In addition, each region comprised an IIEA Roundtable that was relatively active in providing activities for the industrial education teachers in the region. The Roundtable officers agreed to facilitate the information collection at the local school level.

After completion of data collection in the summer of 1979, a Directory for each Roundtable showing all industrial education programs and personnel at the secondary level, grades 7 through 12, were produced. The Directories were provided to the teacher education institutions, state education personnel and distributed to the local teachers by the IIEA. They have been used to facilitate activities for the teachers and programs.

Modifications in the coding, instruments and procedures were made in light of the Pilot Study experiences. The modified procedures were used during the 1979-1980 school year to extend the information base to the remainder of the State outside the City of Chicago. Data were obtained for approximately 1000

school districts during 1979-1980. Directories for all programs and personnel were produced, by Roundtables, during the summer of 1980. They are being distributed during 1980-81 through the IIEA Roundtables.

The Directories are finding extensive uses including: 1) the teacher education institutions for planning and offering inservice education and other activities, 2) a mechanism to contact local teachers for inservice participation in the IIEA Roundtable activities, 3) a means to identify the drafting teachers for inservice activities by the Illinois Technical Drafting Teachers Association, and 4) the junior high school industrial education teachers are also using the Directories for contact and planning activities.

During 1980-1981 the data from the prior collection have been coded and are being entered into the computer for analysis and as an accessable data bank for further use and analysis. Information is also being obtained from the community colleges, correctional institutions and mental health centers.

# CHAPTER 2

## REVIEW OF THE LITERATURE

The review of the literature relating to the causes and results of position changes by industrial educators is presented in two broad categories. It was felt that a shortage has a more basic cause than the simplistic lack of teachers who would accept teaching positions. The reasons that personnel leave or are not attracted to the profession are the foundations of the problem. Therefore, literature relating to job satisfaction/dissatisfaction was one area considered important to this study.

The other category of importance was the extent of the current and projected teacher shortage of industrial oriented teachers.

### Job Satisfaction/Dissatisfaction

The broad area of job satisfaction/dissatisfaction has been extensively researched in the last fifty years. The works of two persons appear to have had a major influence on the work of others. The work of the first, Abraham Maslow (1943), was structured in a dynamic framework of everchanging needs in a hierarchial order. According to Maslow, as a person is able to fulfill one level of the hierarchy of needs the next level becomes more important. Maslow considered the first order of need as physiological requirements, followed in ascending order by safety and security, companionship and affection, self-esteem and the esteem of others, and self-actualization or being able to realize one's potential to the fullest.

If Maslow is correct, the teachers' needs must be met at a variety of levels if the profession expects to keep him/her in the classroom. The most often cited reason for teachers leaving the classroom (Cabot, 1979, Edmunds, 1980, Ice, 1980, and Tomlinson, 1980) is the low salary, in comparison to other possible employment, which would be associated with the lowest levels of need of the hierarchy. According to Maslow's theory, if these levels of need are not fulfilled the need to fulfill higher level needs will not be particularly strong.

Maslow termed this progression as motivation to achieve continuous psychological growth. As the worker achieves each level of satisfaction, a

higher level appears and new aspirations develop. This is theorized as one reason people develop new vocational goals and ideals. It appears that Maslow's theories would have the worker progressing through a series of upward growth steps until his individual needs are sensed as fulfilled. At that point, the worker's life style will tend to stabilize until an opportunity appears to start the move to the next step of advancement. If the mechanisms are not present in the current position to allow for advancement to the next step, the chances of the worker leaving the position for one that appears to allow fulfillment of the perceived need is increased.

The other researcher that has had extensive influence on the study of job satisfaction has been Frederick Herzberg. While Maslow had chosen to look at job satisfaction in a dynamic framework, Herzberg (1959) looked at it in a static framework of what were the satisfiers and dissatisfiers at any one point in time. Herzberg theorized that an employee had two types of needs associated with being a worker, referred to as job attitude factors. The first type of factors were motivators or intrinsic factors, because they provided employees with the possibility to experience continuous growth. The second type of factors dealt with the work environment variables and were named hygiene or extrinsic factors.

Herzberg included in the motivator factors achievement, recognition, nature of the work, responsibility, advancement and the possibility for personal growth. The hygiene factors were said to directly affect job dissatisfaction. They include such variables as company policy, supervision, salary, co-worker relationships and working conditions.

Herzberg's theories give some possible answers to the problems of attracting and retaining industrial educators in the classrooms and laboratories of the public schools. Some industrial education teachers perceive that they not only have to accept a lower salary to teach than they can command in industry, but they must also work within an atmosphere where they are considered to be "not quite as good" as their academic colleagues. These and other factors would contribute, in Herzberg's theories, to teacher dissatisfaction. When the level of dissatisfaction becomes great enough the industrial educator has opportunities available in industry to at least satisfy the financial factor. In addition, for the industrial educator who goes into business or industry, the possibilities exist for advancement and responsibility that are not available to teachers in public education. Under such

conditions the profession would experience difficulties staffing the teaching positions with qualified, enthusiastic teachers.

While Maslow's and Herzberg's theories influenced the research on job satisfaction, they were not the only persons who have studied the relationships of workers' satisfaction/dissatisfaction with their job.

Blauner (1969) divided job satisfaction into four variables. The variables consisted of: 1) occupational prestige (level of skill, income, education, responsibility); 2) control over work (time, physical movement, pace, environment); 3) integrated work groups (social relations, work teams, group creativity); and 4) occupational communities (association of similar interests, shop talk). While these variables are not identical to those of Herzberg, there are close similarities.

Six variables formed the basis of job satisfaction in Vroom's (1964) analysis of job satisfaction/dissatisfaction. Vroom contended that supervision, the work group, job content, wages, promotion opportunities and hours of work were the important factors.

Smith (1967) was concerned with the variables of work performed, supervision style, people at the work place and pay and promotion opportunities. The literature on job satisfaction does agree substantially on the factors that contribute to satisfaction at the work place. The main disagreement seems to be the order of importance each factor occupies. Vroom's emphasis was on the social aspects of work, while Herzberg considered the opportunities for achievement and recognition of achievement as the primary factors that contribute to job satisfaction.

In recent years there has been a change in the attitude that workers have toward the type of job they consider desirable. An adequate salary and long-term job security, at one time, were considered very important in the choice of a job. These two factors were a portion of what traditionally made teaching attractive as a profession. Today, while these factors retain some importance, it seems that other factors are gaining more importance:

> A general increase in their educational and economic status has placed many American workers in a position where having an interesting job is now as important as having a job that pays well. Pay is still important; it must support an "adequate" standard of living and be perceived as equitable--but high pay alone will not lead to job (or life) satisfaction (Work in America, p. xvi).

In a study conducted by the Survey Research Center, University of Michigan (Work in America), a representative sample of 1,533 American workers at all

occupational levels were asked to rank in order of importance, 25 aspects of work. The eight highest ranked were:

1. Interesting work
2. Enough help and equipment to get the job done
3. Enough information to get the job done
4. Enough authority to get the job done
5. Good pay
6. Opportunity to develop special abilities
7. Job security
8. Seeing the results of one's work (p. 12)

It is interesting to note the position of pay and job security in relation to other aspects on the scale. The University of Michigan study was a reflection of the Project Talent (1971) study that found a marked shift between 1960 and 1970 in young people's expectations from their job. In 1960, "job security" and "opportunity for promotion" had ranked at the top in a survey of over 400,000 high school students. In 1970, when the survey was repeated, the results ranked "freedom to make my own decisions" and "work that seems important to me" as the most important.

These changes are very important when looking at the methods that might be used to make recommendations for improvement in the workplace. To assume that an increase in salary will improve an employee's feelings about his/her job could give short term and minimal improvements. On the other hand, if the salary is out of line with what the employee feels is equitable, it can become an overshadowing factor to those more highly regarded factors.

The supply and demand for industrial education teachers is influenced by the job satisfaction/dissatisfaction of the individual teacher. If they derive sufficient satisfaction from their work with students and colleagues, they are more likely to continue teaching. If the intrinsic factors are not present in sufficient quantities, the lack of extrinsic factors, such as salary, are likely to become more obvious and result in a higher level of job dissatisfaction. The decline in intrinsic satisfaction is one possible cause of the shortage of industrial education teachers.

## Industrial Education Teacher Supply and Demand

The literature relevant to the supply and demand of industrial education teachers is not extensive. What does exist is, in most cases, general in

nature and based on surveys whose accuracy is questionable. The lack of accuracy is not the fault of the persons conducting the surveys, but a fault of the lack of accurate systems of teacher and teaching position identification and records. The person answering the questionnaire often had to give "best estimates" of the situation in his state or region.

Rex Miller (1978, 1980) surveyed the nation twice to try to determine the supply/demand for industrial arts teachers. The 1978 report set the shortage at 865 teachers. The 1980 report set the shortage at 1,252 (total adjusted) which was an increase of 387 from the earlier study. It should be noted that the shortage became more acute at the same time that the student population in the public schools experienced a rapid decline (TABLE 2.1). It could be expected that declining enrollments would reduce the teacher demand. This does not seem to have been the result in the industrial arts area.

C. Daniel Miller (1979) made a more detailed national study of the supply of and demand for industrial arts teachers. State supervisors of industrial arts and institutions preparing industrial arts teachers were surveyed to attempt to derive an accurate picture of the situation. A total of 52 supervisors and 205 institutions were surveyed. Forty-seven (90.4%) of the supervisors were able to provide some data. The institutions returned 175 (85.4%) of the questionnaires with at least two of the eight questions answered (p. 88).

Due to lack of information, it was possible to calculate the shortage of industrial arts teachers for only 19 states. In those states there was a shortage of 950 teachers for the 1978-79 school year. Miller determined that 2.2% of the teachers hired for industrial arts positions did not meet the certification standards for the state where they taught (p. 111). Positions held by less than fully certified persons were counted as a part of the shortage.

The number of teachers that left industrial arts teaching positions, calculated for 30 states, was 10.7% (p. 118). Projecting that rate to the approximately 55,000 industrial arts teachers nationally means that more than 5,500 teachers must be replaced annually.

The teacher education institutions reported 4,408 bachelor degrees awarded by 174 institutions in 1976-77 (p. 108). At the 136 institutions where the type of first employment was known, 75.7% of the graduates had accepted industrial arts teaching positions (p. 108).

The teacher education institutions also reported their enrollment and maximum student capacity for industrial arts teacher education. The enrollment

TABLE 2.1: INDUSTRIAL ARTS TEACHER SUPPLY AND DEMAND BY STATES[h]

| | Number of I. A. Teachers by State | | Number of I. A. Classes Not Held Due to Shortage | | Number of I. A. Teachers Produced by Colleges & Univ. | | Number of I. A. Teachers Expected to be Needed | | Shortage of I. A. Teachers Expected | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1977-78 | 1978-79 | 1977-78 | 1978-79 | 1977-78 | 1978-79 | 1978-79 | 1979-80 | 1978-79 | 1979-80 |
| Arizona | 823 | 795 | 25 | 100 | 88 | 42 | 11 | 825 | 11 | 20 |
| California | 7225 | 7024 | 500 | 225 | 200 | 148 | 275 | 125 | 75 | 100 |
| Colorado | 1000 | 1000 | 0 | 0 | 90 | 100 | 50 | 75 | 0 | 0 |
| Connecticut | 1325 | 1323 | 40 | 40 | 88 | 65 | Unk | 20 | 12 | 10 |
| Delaware | 190 | 190 | 0 | 0 | 10 | 10 | [illegible] | 190 | Unk | 0 |
| Florida | 1300 | 1300 | 0 | 20 | 120 | 50 | 160 | 100 | 13 | 50 |
| Georgia | 585 | 565 | Unk[a] | 100 | 30 | 38 | 615 | 75 | 35 | 35 |
| Hawaii | 230 | 230 | 0 | 0 | 25 | 18 | 5 | Unk | 0 | 0 |
| Idaho | 260 | 257 | 0 | 0 | 15 | 13 | 20 | 25 | 0 | Unk |
| Illinois | 4800 | 4730 | Unk | 600 | 175 | 100 | 200 | Unk | 100 | 150 |
| Indiana | 2204 | 2200 | 320 | 0 | 150 | 129 | 73 | Unk | 73 | 8 |
| Kansas | 1100 | 1050 | 120 | 150 | 127 | 107 | 100 | 100 | 30 | 50 |
| Kentucky | 540 | 600 | 50 | 10 | 100 | 45 | 60 | 25 | Unk | 0 |
| Louisiana | 543 | 540 | 125 | Unk[e] | 12 | 85 | 20 | 95 | 20 | 105 |
| Maine | 400 | 400 | 0 | 25 | 11 | 12 | 0 | 20 | 0 | 10 |
| Maryland | 1000 | 1053 | 75 | 55 | 62 | 58 | 90 | 42 | 13 | 21 |
| Massachusetts | 2000 | 2000 | 250 | 0 | 350 | 40 | 75 | Unk | 0 | Unk |
| Michigan | 3000 | 3000 | 0 | Unk | 350 | 347 | 100 | Unk | Unk | Unk |
| Minnesota | 1800 | 1475 | 0 | 0 | 100 | 120 | 100 | 125 | 0 | 5 |
| Missouri | 1253 | 1252 | 350 | 375 | 110 | 90 | 160 | 100 | 50 | 60 |
| Nebraska | 735 | 836 | Unk | 20 | Unk | 65 | Unk | 18 | Unk | 25 |
| Nevada | 215 | 115 | 0 | Unk | 0 | 0 | 20 | Unk | 0 | 10 |
| New Hampshire | 350 | 350 | 0 | 0 | 30 | 24 | 25 | 25 | 0 | 0 |
| New Jersey | 3047 | 2815 | 0 | 0 | 220 | 230 | 53 | 230 | 0 | 0 |
| New Mexico | 319 | 305 | 30 | 35 | 47 | 28 | 12 | 18 | 0 | 8 |
| New York | 4352 | 4295 | Unk | Unk[f] | 379 | 285 | 240 | 180 | 0 | 50 |
| North Carolina | 400 | 314 | 60 | Unk[f] | 70 | 80 | 20 | 21 | 10 | 16 |
| North Dakota | 193 | 194 | 30 | Unk | 37 | 20 | 40 | 32 | 4 | 10 |
| Ohio | 2900 | 2875 | 20 | 25 | 289 | 225 | 300 | 275 | 8 | 50 |
| Oklahoma | 450 | 466 | 40 | Unk | 70 | 80 | 40 | 100 | 25 | 20 |
| Oregon | 1200 | 800 | 20 | 10 | 25 | 25 | 52 | 70 | 25 | 15 |
| Pennsylvania | 3000 | 3032 | 0 | Unk | 185 | Unk | 150 | Unk | 0 | Unk |
| Rhode Island | 530 | 340 | Unk | 8 | 23 | 27 | 31 | 20 | 10 | 12 |
| South Carolina | 150 | 214 | Unk | Unk | 40 | 24 | 200 | 250 | 10 | 34 |
| South Dakota | Unk[a] | 235 | Unk | Unk[g] | Unk | 24 | Unk | Unk | 18 | 3 |
| Tennessee | 568 | 450 | 20 | 12 | 70 | 50 | Unk | 50 | Unk | 20 |
| Texas | 2200 | 2200 | 1400 | Unk | 220 | 190 | 400 | Unk | 290 | 300 |
| Vermont | 202 | 202 | 0 | 0 | 7 | 3 | 3 | 0 | 0 | 0 |
| Virginia | 1085 | Unk | Unk | 15 | 90 | 69 | 150 | 176 | 30 | 90 |
| Washington | 1200 | 1200 | 0 | Unk | 100 | 80 | 100 | 100 | 3 | 10 |
| Wyoming | 240 | 245 | 0 | 3 | 15 | 15 | 45 | 20 | Unk | 4 |
| TOTAL | 54754 | 52489 | 3475 | 1828 | 4130 | 3161 | 4003 | 3437 | 865 | 1301 |
| TOTAL (adjusted)[b] | 53669 | 52254 | 1785 | 1105 | 3945 | 3072 | 2980 | 3369 | 865 | 1252 |
| 1980 additions[c] | | 5261 | | 117 | | 591 | | 692 | | 90 |
| TOTAL (adjusted 1980)[d] | | 57515 | | 1222 | | 3663 | | 4061 | | 1342 |

[a] Unk - Unknown information.

[b] Total (adjusted) - does not include those states where data were not available for both reporting years.

[c] 1980 additions - totals from those states in 1980 report that were not in 1978 report.

[d] Total (adjusted 1980) - includes 49 states plus Puerto Rico.

[e] 35 labs closed.

[f] 11 programs closed.

[g] 6 labs closed - 3 schools still looking for teachers.

[h] Source Miller 1978, 1980

for 167 institutions (1978-79) was 18,001. Capacity was reported as being between 32,407 and 32,827 students (p. 110). At the time of the study the teacher training programs were operating at 51.5 to 52% of capacity.

Miller concluded that at the 1978-79 rate of teacher production and turnover the demand was outstripping supply. "If the number of graduates were twice what they were in 1976-77 it does not appear likely there would have been enough teachers to meet demand" (p. 114).

While C. D. Miller was able to provide more detailed information concerning the supply of industrial arts teachers, his report suffered from a lack of data from many states, several of which were large, heavily populated, industrial states, e.g., Michigan, Illinois, Wisconsin, Pennsylvania. Until more studies are done or better data collection systems are developed at the state level, the profession will not have the data that would make a study similar to Miller's more accurate.

The situation reported by R. Miller and C. D. Miller is not one that has just occurred in recent years. Maraviglia (1969) wrote during the rapid enrollment increases that there were not enough graduates to fill the positions available. The earlier studies reported that many of the graudates were taking jobs in industry, much the same as the more recent studies reported. One of Maraviglia's conclusions was "...that the industrial arts educational institutions will not, at their present level, be able to fill this gap in meeting demands for industrial arts teachers" (Maraviglia, p. 11). This was written during a period of high student enrollment in colleges of education.

The enrollment in teacher education has reacted strongly to the falling student enrollment and its effects as reported by the mass media. During the latter half of the 1960's, when the post-war "baby boom" was moving through the schools, there was a shortage of teachers in all areas. In the fall of 1968 the percentage of the entering collegiate freshman class declaring education as a major was 22%. Five years later as the teacher shortage became a teacher glut, as reported by the media, the percentage had fallen to 8.8% and has varied from 6.2 to 8.0% between 1973 and 1978 (NEA, 1979, p. 12). At no time, during this rapidly changing situation, has the available supply of industrial education teachers equaled the demand.

There have been several reasons put forth in the literature for the continued shortage of industrial education teachers. The most common reason is the disparity of salaries between education and industry. The other, which is likely related, is the lack of students choosing to enter teacher preparation

programs. Two articles appeared in the June 1978 issue of Phi Delta Kappan; both predicted a coming teacher shortage in the 1980's. In one article Musemeche and Adams (1978), cited the "precipitate decline in teacher preparation" and a small but definite reversal in the birthrate in the United States. Herman's article (1978), in the same issue, was based on the same criteria. It also cited a 1974 RAND Corporation study (Carroll, 1974, p. 25) which predicted a shortage because the "inertia in the system" will take so long to reverse itself. Both articles attributed some of the cause to media emphasis on oversupply of teachers, low pay and "blackboard jungle" situations. Herman also listed twelve areas where there were opportunities for teachers; industrial arts was one. While both these articles pointed to future shortages of a wide variety of teachers, Dunathan (1979) found a shortage of "good" teachers to be at hand in a survey of superintendents of nine mid-western states. Sixty-five percent of the respondents reported shortages of vocational and industrial teachers. The situation is likely to become more acute for industrial education teachers. Industrial arts and vocational industrial education teachers have been in short supply for at least the last twenty years, regardless of the general supply of teachers.

Zook (1976) based his article, on industrial teacher shortages, on a study by the Research Committee of the Association for School, College and University Staffing conducted in 1975. The survey of the placement directors at teacher education institutions in the fifty states and the District of Columbia had a return rate of 80%. Not one of the respondents had an oversupply of industrial arts teachers. Thirty-seven of the states gave the same responses when questioned about the supply of trade and industrial education teachers.

Cabot, in his master's thesis at the University of Wisconsin-Stout (1979), surveyed 10% of the industrial education graduates from UW-Stout who had graduated between January, 1968 and December, 1978. He found 53.3% of the respondents were teaching or in education at the time of the follow-up. Approximately 17% had left teaching with one year or less of experience. Of the graduates who had left teaching, the largest percentage were working in "related fields in industry" (p. 50).

Cabot asked those who left teaching to state the one major reason they had left. Lack of salary was given by 37.7%, followed by "student attitudes", "work load not in line with salary" and "no chance for advancement", with 7.3% each. About 5% listed as the major reason "discipline, lack of satisfaction from students" and that teaching was "no longer challenging" (p. 36).

Two major conclusions were reached by Cabot (1979):

1. Industrial educators must be paid to their satisfaction. Unlike most others in education today, the industrial educator has an obvious way out if he wishes to leave teaching.

Industry, as well as other portions of the private sector, find the industrial educator an attractive candidate for positions, positions that may meet the person's need more completely.

2. The industrial education program...must become more relevant. Students should be given a clear picture of the situation in today's school from the beginning of their training. They must be involved in clinical experiences continuously, not only in industrial education, but in other aspects of the schools' operation. Curriculum revisions must be made to provide "teacher trainees" with skills in discipline, student motivation, administration, needs of special education students, and school law (p. 51).

Edmonds (1980) completed a follow-up study of 24 industrial education teachers who had left teaching positions in Nebraska at the end of the 1978-79 school year. The reasons given for leaving education were: lack of compensation, lack of administrative support, inadequate resources and facilities, job conditions, poor teacher preparation to meet todays needs, low status of industrial education and poor parental and student attitudes. One single item that drew a particularly high rating was concerned with student use of drugs and their effect on safety in the laboratory. The former teachers were asked if they would consider returning to the classroom and if so under what conditions. Almost 60% said they would but the majority of those would only consider doing so at the post-secondary level. The other factors that would be necessary to bring them back into the classroom were better salaries and improved administrative support.

The Advisory Council for Technical-Vocational Education in Texas (Ice, 1980) surveyed the 54 executive directors of State Advisory Councils to determine the factors most responsible for vocational teacher shortages in their state. The following factors were reported as a result of the survey: the salary differential between education and industry was listed first by all respondents, lack of applicants in certain fields, job availability in the private sector, not properly rewarding prior work experience, generally perceived low status of the teaching profession, having security in their trade union, no incentives for increased productivity, inadequate facilities and equipment, and reluctance of administrators to provide extended contracts.

Similar results were reported by Lindsey (1979) from a group of 200 Texas industrial education teachers. One-half of the group was composed of teachers who had begun teaching in 1976-77 and left teaching after one year. The rank order of the reasons given for leaving industrial education teaching were:

inadequate salary, the program was used as a "dumping ground", there were too many dicipline problems, a better job opportunity was offered, student attitudes toward the program were poor, and a lack of cooperation from school administration. While the previous reasons would be considered as dissatisfiers in the work place, Lindsey also solicited the reasons why the respondents chose to teach industrial education. The following, again in rank order, are factors from which they expected to receive satisfaction: the opportunity to work with young people, personal satisfaction from teaching as compared to industrial work, making a greater contribution to society, having "time off" during the summer, and having more time with my family.

Cunico and Fields (1977) surveyed all industrial arts teachers in New Mexico to determine if there was a difference in satisfaction/dissatisfaction factors between those teachers that planned to remain in teaching and those that planned to leave. They found significant differences in the responses of the two groups relative to the areas of administrative support, student relations and attitudes, monetary rewards, and school related problems such as facilities and equipment. Those that planned to leave teaching were particularly dissatisfied with a perceived lack of interest in industrial arts by administrators, a lack of knowledge on the part of administrators relative to the purposes and content of industrial arts, students being more interested in project work rather than conceptual development, and higher salaries in industry as compared to teaching. Those that were leaving education had derived satisfaction from the following factors: their own teaching capabilities, student advisement and counseling relative to industry-related careers, and the respect the teacher earns as reflected in the performance of the students. Two of the recommendations made as a result of the study were actions to improve communications at all levels and programs to better inform administrators of the purpose, content and contribution of industrial education.

Cabot, Cunico and Fields, Edmunds, Ice and Lindsey were all concerned with the factors that were causing a shortage of industrial education teachers. There appear to be several factors that were consistently cited as influencing teachers to leave education. The first was monetary, followed by student attitudes, the perceived low status of teaching, lack of administrative support, and the programs being used as a "dumping ground".

Others have studied why teachers, in general, leave and Knight (1977) studied why agricultural teachers leave. Knight surveyed vocational agriculture teachers in Ohio. He compared former and continuing teachers and determined

that the five chief reasons vocational agriculture teachers left teaching were: 1) long range goals differing from teaching vocational agriculture, 2) lack of student interest, 3) inadequate advancement opportunities, 4) long hours, and 5) inadequate salary.

There are many similarities in the supply/demand situation between vocational agriculture and industrial education teachers. Both groups have readily available employment opportunities outside teaching. Therefore it is not surprising that the reasons given in Knight's report so closely parallel those given by industrial educators in the other studies.

Thompson's (1972) study entitled "The Labor Market for Illinois Community College Occupational Instructors", stated that:

> Educational institutions are in a competitive market with business and industry for occupational instructors which may require different standards for salary, recruitment, etc. if qualified instructors are to be found (p. 4).

It appears that the competition for teachers is as active in 1980 as it was in 1972. The monetary costs of recruitment, orientation and training could be as damaging as the disruption brought on by employee instability.

To reduce some of the "expenses" brought on by teacher turnover, Wiens (1973) conducted a study to identify the characteristics of "mobile" and "stable" occupational educators. His conclusions were that mobile occupational educators as a group tended to be younger, draw lower salaries, hold fewer association memberships, have had fathers with higher educational attainment, live farther from their parents and have higher educational attainment than their stable colleagues (p. 199). These findings seem to support the Thorndike and Hagen (1955) study cited in Wiens. Their study was of the work careers of 10,000 male World War II veterans. Four hundred fifty-nine were involved in education, at the time of the study, while 200 had dropped out of education. Their conclusion about the education group was that:

> ...it appears that those who were academically more capable and talented tended to drop out of teaching and those who remained as classroom teachers in elementary, and secondary schools were the less intellectually able members of the original group (p. 36).

Whether Wiens' conclusions can be put to use by local administrators has yet to be seen. One of the prerequisites to using the characteristics of a "stable" group to assist in hiring would be enough candidates to offer a choice. With the current situation of supply versus demand the local administrators consider themselves lucky if there is more than one applicant for an industrial education teaching position.

McLean and Moss (1979) reported on a replacement need study of vocational-technical teachers in Minnesota. They found that the average annual replacement needs for the state from death, retirement, leaving education, leaving state or moving to a different teaching field or a non-teaching position in education was 16.4% for industrial education and 32.5% for technical education. The study covered a four-year period from 1973 to 1977. In 1976-77 the number of estimated replacements that would enter education as graduates of teacher education programs was three to six times less than required (p. 37). Thus local schools, especially rural schools, would not likely have many applications from which to make a choice.

Smith (1979) reported on a survey of placement directors and state supervisors of industrial arts. Twenty-one of the fifty states reported severe shortages and twenty reported moderate shortages. Only nine states reported slight or no shortages. The states reporting severe shortages were primarily in the mid section of the country and included Illinois, Indiana, Michigan, Ohio, Missouri and Iowa.

Smith was careful to warn about the validity of the information because of the varying degree of involvement of the respondents. Some state supervisors were very active in teacher placement, others had very little to do with recruitment and placement. Placement directors, the other group of respondents, may have tended to present a more regional picture than a state by state view. The regional view would be especially true of those placement directors at schools with long standing records for industrial teacher education.

The statistics from the National Education Association show a steady decline in industrial arts graduates from 1950 through 1966. From 1970 to 75 the numbers of graduates increased by as much as 22%. After 1975 the trend has been downward with fewer and fewer graduates from industrial teacher education programs. In 1976 there was a 14% drop and in 1977 a 19% decline. These figures reflect the general trend of falling enrollment in teacher education programs across the nation. From a high of 74,299 graduates in 1971-72 to 36,850 graduates in 1979-80, the pool of potential teachers has contracted to a point that a general teacher shortage is not difficult to foresee (ASCUS, 1980, p. 3).

In March of 1980, the Association of School, College and University Staffing (ASCUS, 1980) released a follow-up of their 1976 report of teacher supply and demand in the United States. The report was based on the responses of placement directors at institutions involved in the preparation of

elementary and secondary teachers across the nation. The directors were asked to report their perceptions of the shortage/surplus of teachers of 34 subject areas for elementary and secondary education. They were asked to use an index of one to five with one being considerable surplus and five being considerable shortage. On a national basis, industrial arts was the only subject that was rated as having a considerable shortage. Twenty-two of the 34 states rated industrial arts as a five, ten states rated it a four (shortage) and five states did not have the information available. Trade, industrial and vocational technical teachers were rated as being in considerably short supply by 17 states and in short supply by 10 states. One state rated this group as having a considerable surplus and six states did not have the necessary information

## Industrial Education Teacher Supply in Illinois

Illinois has experienced the same difficulties as the other states in obtaining enough qualified industrial education teachers to staff the programs in the state. In an effort to determine the status of the supply and demand of industrial educators, a project entitled Industrial Education Information System (IEIS) was funded by the Illinois State Board of Education and carried out by the University of Illinois. The study, started in September of 1978, was to include several parts to be carried out in three phases. One of the parts was a five year follow-up of B. S. graduates of industrial teacher education programs offered by seven state universities in Illinois (Tomlinson, 1980). Each institution was provided a format of the questionnaire to be used in a survey of their graduates during the five year period beginning with July 1, 1973 and ending with June 30, 1978. The seven institutions agreed to use the same questionnaire, making only those modifications necessary because of the differences in titles of the departments etc. at each institution. Each institution mailed the questionnaire to its graduates, edited the returned questionnaires and provided the project staff with the raw data on punched cards or coded sheets for further data reduction and analysis.

There was a total of 1188 B. S. graduates in the study. See Table 2.2. Because of a misinterpretation of instructions, some June, 1973, graduates were sent questionnaires. The 45 returns from this group were included in the analysis. A total of 607 graduates returned questionnaires. There was some information available on an additional 325 graduates, from student records, etc.

TABLE 2.2: NUMBER OF B.S. IN INDUSTRIAL EDUCATION AND INDUSTRIAL TECHNOLOGY GRADUATES IN ILLINOIS BY UNIVERSITY[a] AND YEAR, 1973-1980

| | Industrial Education | | | | | | | | Industrial Technology[b] | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | CSU | EIU | ISU | NIU | SIU | UI | WIU | TOT | CSU | EIU | ISU | NIU | WIU | TOT |
| 72-73 | 26 | 29 | 72 | 44 | 31 | 29 | 24 | 255 | - | 18 | Unk | 66 | 19 | 103 |
| 73-74 | 15 | 34 | 40 | 45 | 49 | 40 | 34 | 257 | - | 24 | 91 | 78 | 33 | 226 |
| 74-75 | 16 | 21 | 39 | 27 | 42 | 30 | 27 | 202 | - | 12 | 111 | 77 | 26 | 226 |
| 75-76 | 8 | 18 | 42 | 35 | 23 | 23 | 37 | 186 | - | 11 | 104 | 70 | 42 | 227 |
| 76-77 | 14 | 22 | 36 | 42 | 22 | 23 | 35 | 194 | - | 15 | 131 | 66 | 30 | 242 |
| 77-78 | 18 | 26 | 31 | 34 | 15 | 9 | 41 | 174 | 3 | 9 | 144 | 91 | 45 | 292 |
| 78-79 | 15 | 30 | 20 | 36 | 34 | 15 | 29 | 179 | 11 | 11 | 129 | 80 | 49 | 280 |
| 79-80 | 11 | 28 | 23 | 23 | 20 | 20 | 36 | 161 | 5 | 24 | 144 | 135 | 53 | 361 |
| Total | 123 | 208 | 303 | 286 | 236 | 189 | 263 | 1608 | 19 | 124 | 854 | 663 | 297 | 1957 |

a: CSU - Chicago State University
EIU - Eastern Illinois University
ISU - Illinois State University
NIU - Northern Illinois University
SIU - Southern Illinois University
UI - University of Illinois
WIU - Western Illinois University

b: Five of the seven Industrial Education Departments also offer a non-teaching technology option.

The total number of graduates, for the five year period, was 1143. The number of graduates per year has followed the national pattern of decline. If only calendar years are looked at, 1974 was the high point in the number of graduates with 257. In 1975 there were 202 graduates, followed in 1976 with 186 and 194 in 1977, the last calendar year for which data were available (p. 7). During the five year period of the study, the decline has been approximately 30%. According to additional data from representatives of the seven universities, the decline has continued through 1980. The actual number of graduates from 1972-73 through June 1980 are shown in Table 2.2. There has been a decrease of 36.9% in the number of graduates per year from 1972-73 to 1979-80.

Five of the seven Industrial Education departments, (CSU, EIU, ISU, NIU, and WIU) also offer a non-teaching B. S. degree program in industrial technology. The University of Illinois does not offer a technology program. A separate college, the School of Technical Careers, at Southern Illinois University offers a variety of technology degrees.

As the number of graduates prepared to teach industrial education has declined 36.9%, the number of graduates in the technology programs has increased 60%. See Table 2.2. Although objective data are not available, the department chairmen estimate that the average beginning salaries of the technology graduates exceed those of the teacher education graduates by at least $5000 per year.

The trends in enrollment for industrial education vs industrial technology as well as the salary differential are reported in a similar manner to those in Illinois by most institutions across the country.

It is known that all graduates do not enter teaching as their first employment after graduation. The percentage of students employed in education ranged from 44.2% at the University of Illinois to 84.6% at Chicago State University. Approximately 65% of all graduates took jobs in education as first employment after graduation (Tomlinson 1980, p. 15).

The follow-up also confirmed the trend of those in teaching leaving the profession for jobs in industry, government or self-employment. About 73% of all graduates of industrial teacher education programs have held teaching jobs. Approximately 65% of all graduates enter teaching the first year after graduation. By the second year only 53.5% of the graduates were in education. By the fifth year the percentage employed in education had fallen to 43.2% of all graduates (p. 26).

As might be expected, business and industry had attracted the bulk of the persons not employed in education. Beginning with 19% of the new graduates this group jumped to 34.7% by the second year, and slowly climbed to a peak of 37.6% by the fifth year after graduation. Self-employment and employment by government also showed a steady rise in the percentages of employment (p. 26). See Table 2.3 which is from Tomlinson, 1980, p. 19.

As shown in Table 2.3, there were 389 cases where both first employment (including graduates from 1973 through 1978) and employment in 1979 were known. A total of 216, 55.5%, had taken first employment in education. In 1979, only 175 or 45.5% of the total were employed in education or a decrease of 25.9% in education. A total of 56 graduates had left education for other employment while a total of 15 had moved from other employment to education. This is a ratio of almost four to one for certified teachers who leave education to those who return to education for those teachers who have had their BS degree from one to six years.

The university B. S. follow-up also attempted to determine the graduates' plans for remaining in education or returning to education in the future. When those in teaching were asked if they planned to remain in teaching, 30.9% said no and 11.6% were undecided (p. 30). When asked why they did not want to remain in teaching, 82.3% responded "Higher pay and benefits in other jobs" (p. 31). About 56% of those that gave a first response to the question also gave a second reason for not wanting to remain in education. The most common second reason was "Too many problems with students, administration, etc."

The group of graduates that were not in education were asked their intentions to return to or seek employment in education in the future. Of this group, 85.3% gave the same reasons for not reentering or entering education: "higher pay, benefits in other employment" (p. 32).

## Summary

The public schools of the United States, including those in Illinois, are experiencing a severe shortage of industrial education teachers. If there is to be an effort made to meet the demand for teachers it is necessary to investigate the current situation to determine what job related factors influence industrial educators to leave the classroom.

TABLE 2.3: FIRST JOB-TYPE OF EMPLOYMENT BY CURRENT TYPE OF EMPLOYMENT FOR GRADUATES OF EIU, ISU, NIU, SIU, UI, WIU

| First Type of Employment | Current Type of Employment: Education | Business/ Industry | Self Employment | Government | Student | Other | Deceased/ Disabled | Row TOTAL |
|---|---|---|---|---|---|---|---|---|
| Education | 160[a] | 33 | 12 | 4 | 3 | 2 | 2 | 216 |
| | 74.1[b] | 15.3 | 5.6 | 1.9 | 1.4 | 0.9 | 0.9 | 55.5 |
| | 91.4[c] | 23.6 | 40.0 | 12.9 | 50.0 | 40.0 | 100.0 | |
| | 41.1[d] | 8.5 | 3.1 | 1.0 | 0.8 | 0.5 | 0.5 | |
| Business/Industry | 8 | 104 | 6 | 2 | 0 | 0 | 0 | 120 |
| | 6.7 | 86.7 | 5.0 | 1.7 | 0 | 0 | 0 | 30.8 |
| | 4.5 | 74.3 | 20.0 | 6.5 | 0 | 0 | 0 | |
| | 2.1 | 26.7 | 1.5 | 0.5 | 0 | 0 | 0 | |
| Self-Employment | 4 | 0 | 12 | 0 | 0 | 0 | 0 | 16 |
| | 25.0 | 0 | 75.0 | 0 | 0 | 0 | 0 | 4.1 |
| | 2.3 | 0 | 40.0 | 0 | 0 | 0 | 0 | |
| | 1.0 | 0 | 3.1 | 0 | 0 | 0 | 0 | |
| Government | 1 | 1 | 0 | 24 | 0 | 1 | 0 | 27 |
| | 3.7 | 3.7 | 0 | 88.9 | 0 | 3.7 | 0 | 6.9 |
| | 0.5 | 0.7 | 0 | 77.4 | 0 | 20.0 | 0 | |
| | 0.3 | 0.3 | 0 | 6.2 | 0 | 0.3 | 0 | |
| Student | 2 | 1 | 0 | 1 | 3 | 0 | 0 | 7 |
| | 28.6 | 14.3 | 0 | 14.3 | 42.9 | 0 | 0 | 1.8 |
| | 1.1 | 0.7 | 0 | 3.2 | 50.0 | 0 | 0 | |
| | 0.5 | 0.3 | 0 | 0.3 | 0.8 | 0 | 0 | |
| Other | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 3 |
| | 0 | 33.3 | 0 | 0 | 0 | 66.7 | 0 | 0.8 |
| | 0 | 0.7 | 0 | 0 | 0 | 40.0 | 0 | |
| | 0 | 0.3 | 0 | 0 | 0 | 0.5 | 0 | |
| Column TOTAL | 175 | 140 | 30 | 31 | 6 | 5 | 2 | 389 |
| Column Percent | 45.0 | 36.0 | 7.7 | 8.0 | 1.5 | 1.2 | 0.5 | 100 |

[a] N = Number of cases in cell.

[b] Row Percent = percent of cases in this cell of those in total row; e.g., 160 of 216 - 74.1%.

[c] Column Percent = percent of cases in this cell of those in total column; e.g., 160 of 175 = 91.4%

[d] Percent of Total = percent of cases in this cell of the total cases; e.g., 160 of 389 = 41.1%

Note: This table is to be read as: Of the 216 graduates who took their first job in Education, 160 or 74.1% were still in Education in 1979; 33 were in Business/Industry. Of all 389 cases where first and current type of employment were known, 175 or 45.0% were in Education in 1979; 140 or 36.0% were in Business/Industry, etc.

Maslow, Herzberg, Blauner, Vroom and Smith have all reported research in the field of job satisfaction/dissatisfaction. While there are obvious discrepancies in their theories, there is sufficient common ground to apply their theories to industrial educators. The decline in the status of teaching in the public schools combined with the disparity of the salaries offered to the teachers in comparison to other employment are two factors that meet the writers' criteria for promoting job satisfaction. Other factors that appear to be causing dissatisfaction are administrative and student attitudes toward industrial education. These are reflected in such areas as facilities and resources, student discipline, drugs in the classroom, and work loads.

Industrial educators appear to be one group that has readily available alternatives to public school teaching. The numbers and percentages of new industrial education graduates that are opting for careers in business and industry is a contributor to the critical shortage situation. Another factor is the number of industrial education teachers who are leaving the classroom after relative short teaching careers. If the reasons for their dissatisfaction can be determined, it may be possible to modify the teaching environment to retain and attract enthusiastic and qualified industrial education teachers to the public schools of Illinois and other states.

# CHAPTER 3

## METHODS AND PROCEDURES

The Industrial Education Information System Project (I.E.I.S.) was initated in cooperation with all of the seven state universities that prepare industrial education teachers, the Illinois Industrial Education Association, and the Department of Adult, Vocational and Technical Education of the Illinois State Board of Education. It was initiated in the Fall of 1978 to establish a data base to determine the number and types of industrial education programs in the State as well as background on the teachers in those programs. The ultimate objective of establishing this data base was then to be able to deliver improved in-service education and other services for the improvement of industrial education programs in the State of Illinois.

Two types of activities were undertaken by the IEIS Project during Phase I (1978-1979): 1) a survey of all BS degree graduates in industrial education from the seven state universities in Illinois. All graduates who completed their degrees from July 1, 1973 through June 30, 1978 were sent a questionnaire by the respective individual institutions in the Spring of 1979. This study of all graduates was conducted to determine the potential supply of industrial education teachers produced in Illinois. The results of this study are reported in IEIS Report No. 2 (Tomlinson, 1980). 2) a Pilot study was conducted during Phase I to determine the number and type of industrial oriented programs and teachers in two geographic areas of the State and to develop and to pilot test procedures for the statewide study. The results of this Pilot study are reported in Chapter 4 of the report and provide the data base for the follow-up study of teacher turnover.

During 1979-80 the procedures developed in the Pilot study were extended to all public school districts in the state of Illinois outside of the city of Chicago. Data were obtained for all attendance centers in the public schools which contained grades 7 and above.

Existing sources of data including the last published directory of all school districts in the state of Illinois and a listing of teachers from the Department of Adult, Vocational and Technical Education were utilized as a base for conducting the Pilot study in the two geographic areas. A printout of all principals was obtained from the Illinois State Board of Education to provide a

comprehensive coverage of all public schools in the two regions. The last published state directory of all approved schools in the state included a listing of all private schools in the areas. However, this directory was for the 1976-77 school year. All public and private schools were included in the Pilot study. Questionnaires and coding formats were developed and field tested at selected schools where cooperating members of the Illinois Industrial Education Association were located. After the Pilot study, the forms were revised for some classifications and to accommodate specialized situations. A similar procedure was utilized for the printed instructions that accompanied the forms.

Contact persons for each of the two Illinois Industrial Education Association Roundtables were identified. Each of these contact persons agreed to distribute the questionnaire forms to each of the local schools in their Roundtable. The completed forms were then returned to a contact person in each local school district and then to the Roundtable contact person and finally back to the IEIS office. One of the criteria utilized in selecting the two geographic regions was an active Roundtable which had contacts with the industrial education teachers in most of the school districts within their Roundtable. Some funds were available to the Roundtables to cover their expenses and to provide assistance in gathering the field data. This approach was relatively effective in most cases. On-site visits by the contact person were made in many of the cases. Where difficulties were encountered, direct phone calls were made from the IEIS project office to obtain all data or the remaining data where some information was incomplete.

## The Population

The population for this study was the industrial education teachers and their teaching positions in the public schools that were identified in the Pilot study of industrial education programs in the Rockford and Peoria regions during the 1978-79 school year. The school districts, teaching positions and industrial education teachers were believed to be representative of the remainder of the state. The positions were in school districts that ranged from small and rural, the smallest having an Average Daily Attendance (ADA) of 130 students, through suburban and urban, and included two of only twelve school districts in the state that had enrollments of 12,000 or more students, Rockford with an ADA of 30,569 students and Peoria with an ADA of 18,801 students (Illinois State Board of Education 1979b).

The communities included rural, agriculturally oriented, suburban, and urban, heavy industrial centers dominated by such companies as Caterpillar, Borg-Warner, Chrysler, Rockford Machine and Tool, and Sundstrand.

The Rockford region included five counties with 40 school districts of which 30 (75%) had some type of industrial education program. There were 172 teachers and/or teaching positions in the region. The Peoria region included four counties with 61 school districts of which 30 (49%) had industrial education programs of some type. There were 152 teachers and/or teaching positions in this region during the 1978-79 school year. A more detailed description of the school districts, attendance centers and personnel will be presented in Chapter 4.

## Teacher Turnover Sample

The sample consisted of those industrial education teaching positions that experienced a position change between January, 1979 and January, 1980. The sample included both the positions and the teachers involved in those positions where a position change occurred.

The Pilot study identified 24 of the 60 districts or 40%, with industrial education programs that had one or more vacancies. A total of 40 FTE vacancies (44 teachers) were reported by the 24 districts for the beginning of the 1978-79 school year. At the time of that survey, eight of the 60 districts (13.3%) had not been able to find teachers to fill 11 FTE vacancies.

The information from the 1978-79 Pilot study provided baseline data for teacher turnover. It was expected that the number in the sample for this study would be approximately the same.

## Data Collection

It was decided that a telephone interview would be the most expedient and appropriate method of data collection in terms of its ability to solicit the needed information in a short time, and its relative expense in relation to an on-site interview or mailed questionnaire. The cost was not considered to be excessive in comparison to a mailed questionnaire when the costs of reproduction, postage and the other expenses for follow-ups were considered. Since the sample was expected to be relatively small and it was important to achieve as high a response rate as possible, the telephone interview was more appropriate.

It was expected that the majority of the telephone interviews with individual teachers who had left a position would be conducted in the evening when the toll rates were lower. With the lower evening tolls and the availability of a WATS line, the expenses of the interview were considered to be in line with those of a mailed questionnaire but also had the additional advantage of a personal interview without the travel expense.

Every district that had been identified as having an industrial education program in the Pilot study was contacted by phone to determine if any position change had taken place. The person contacted was the administrator that had the most direct responsibility for the industrial education program in their district or attendance center. In the majority of cases this person was the building principal. In the remaining cases it was the district superintendent or in the case of some larger districts the director of vocational education or industrial education department head.

## Data Collection Instruments

To aid in the data collection, an interview schedule was developed for each target group. The Building Vacancy Information (BVI) form was used to seek information relative to the position vacated by an industrial educator. Information was sought concerning the current address of the teacher who left an industrial education teaching position, current status of the position and from where the replacement teacher had been recruited if the vacant position was filled.

During the course of the BVI interview the respondent was asked if there had been any changes in the industrial education teaching staff between January, 1979 and January, 1980. If there had been no change, they were asked if they expected any changes in the next year. Change, in this instance, was defined to mean addition and/or reduction in the program that would affect the number of teachers that would be employed by the school. If there had been no change, the interview was ended at this time.

If the school had experienced a change in the program or personnel during the target period the respondent was asked an additional set of questions to obtain information about the reason(s) for the change. The information requested was: the name of the teacher that was no longer in the position, the name of the teacher, if any, that currently held the position, and the status of the position if it was still vacant.

The information collected relative to the former teacher was: name, most current address, reason(s) given for leaving the position, would the teacher have been rehired and did the teacher teach a reimbursed vocational education course(s). If a current address was not available from the respondent other information such as place of employment, last known city of residence, and university of graduation were requested to aid in making contact with the former teacher. The telephone directory assistance operators proved invaluable assistance in locating several subjects. Additional information was available for each teacher from a personal data sheet that the teacher had completed during the previous year as part of the Pilot study. This information consisted of: age, number of years teaching industrial education, number of years teaching in the district, type of teaching certificate held, industrial oriented teaching specialties, industrial teaching and other assignments expressed as a percent of their total time, and their teaching load for the Fall or Spring term of the 1978-79 school year. Because of the amount of information that was available about each teacher, from the two sources mentioned, it was expected that the telephone interview would be shortened by not having to solicit the same information during the interview.

In those cases where there had been a change which indicated a teaching vacancy in an industrial education teaching position, the respondent was asked the current status of the position. If the vacancy had been filled, the name of the new teacher was requested to update the directories compiled during the Pilot study of the IEIS. A description of the new teacher's background was requested to assist in developing a picture of what type of experience industrial education teachers had before they accepted new or different teaching positions in the public schools of Illinois. The respondent was also asked the methods used and the geographic area covered during the recruiting of the new teacher. This information was needed to determine if there were any methods that were more successful than others in a short supply situation.

In those situations where the vacancy had not been filled, the respondent was asked the current status of the position. There were six categories of answers provided. In most cases it was predicted that the course was discontinued temporarily until a teacher or funds could be found to continue the program. There were three categories of reasons if the program was discontinued permanently: lack of a teacher, lack of funds or declining enrollments. The provision was also made for the situation where the program was being continued with the remainder of the staff teaching the courses as an overload or using substitutes until a permanent replacement could be found.

It was also necessary to develop an interview schedule for the teachers that had left an industrial education teaching position. The Teacher Telephone Interview (TTI) schedule was used during the interviews of those teachers who had been identified as having left an industrial education teaching position during the BVI interviews. The schedule consisted of five sections: demographic data, current employment information, reasons for leaving an industrial education position, gross annual income changes and what circumstances would be necessary to attract them back to teaching industrial education in the public schools.

The first section of the TTI schedule contained the demographic data that were available from the individual teacher forms completed during phase one of the study. This section also included questions regarding the marital status, number of children in age groupings, i.e., preschool, elementary, junior high, etc. Previous full-time industrial experience and industrial specialty were asked as part of this section.

The next section was to seek information about the current employment in which the respondent was involved. This section was divided into four broad categories: education, business/industry, self-employment and retirement.

If the respondent was currently in education, it was determined if the position was in the same or a different district. Also the person was asked in what area of education they were working. The areas were: industrial education, administration, counseling and teaching a subject other than industrial education. If the respondent was teaching another subject, the particular subject was identified.

For the group of teachers that had left industrial education for jobs in business/industry there was a separate group of questions to determine their current job status. Seven categories were provided for different types of jobs in this category. They were: management/supervisor/foreman, engineer/technician, skilled tradesman/technician, sales, service, education/training and other. These teachers were also asked to evaluate their industrial education technical and professional training in relation to its value in obtaining their new job. The evaluation was one "as perceived" by the respondent and was scaled from necessary (5) to very important (4), important (3), somewhat important (2) and unimportant (1). The results of this question are reported in frequency distribution with means and standard deviations.

The respondents, in this category, were also asked how they obtained their new positions. The answers were divided into two categories: those that initiated the job search and those that were approached by the employer. The purpose was to determine if industrial education teachers were seeking another job to

fulfill a need that was not being met in their former teaching position or were being sought out by employers and offered a more attractive position. In those cases where the teacher initiated the job search there was a presumption that they were sufficiently dissatisfied with their teaching position that they sought a position they perceived would be more fulfilling of their needs. Those teachers that were approached by a prospective employer were presumed to have been less dissatisfied with their teaching position, but saw something in the new job that was more attractive than the present position.

For the group that entered self-employment, the same questions about the importance of their industrial education technical and professional training were asked. They were also asked to identify the category of self-employment in which they were engaged. The categories were: sales, service, manufacturing/production, construction or other. The final question on self-employment was whether their current work had developed from previous part-time or summer work.

The final group, those who had retired from teaching, were asked three questions about their present activities. The first question was whether they were currently receiving a pension from the state teachers retirement system. Those who answered that they were drawing a pension were presumed to have spent enough time in the profession to have qualified for a pension and to have been reasonably satisfied with their jobs, at least satisfied enough to have remained long enough to qualify for a pension. Those who were not drawing a pension were presumed to have not taught long enough to qualify for a pension or to have taken an early retirement and were waiting until a more advantageous age to apply for their pension. Those who took early retirement were presumed to have been less satisfied with their teaching positions and chose to leave the profession rather than teach until they could begin drawing a pension immediately.

The retired teachers were asked their current employment status. There were four responses from which they were asked to choose: employed full-time, employed part-time, self-employed, and not employed. For those who were employed full-time, part-time, or self-employed, the appropriate questions from the previous sections were asked. This group was also asked why they retired at the time they had. The responses for this question were: retired "early" to enter other work, retired due to disability, retired to "relax and enjoy life", or retired due to mandatory age limit.

The third section of the TTI was concerned with why the person had left an industrial education teaching position. To arrive at higher level meanings

than the typical "more money" answers, the respondent was asked to list the things they missed most about their previous teaching position. The responses were reported and later categorized. The categories were: working with students, faculty, administration, job status, job security, working conditions, the chance to be creative, the variety in teaching, having summers off, salary, and other. The respondents were also asked to list those things they least missed about their previous industrial education teaching position. Their responses were treated in the same manner as the previous question. The categories for this question were: teaching load, student problems, inadequate salary, inadequate fringe benefits, poor teaching facilities, extra assignments, administrative problems, low program budget, no summer pay, community problems and other.

The fourth section of the TTI dealt with the gross annual income differential of the respondent. When responding to this question, the respondent was asked to consider the differential between the previous and current income including fringe benefits in one thousand dollar increments. The change could have been an increase, decrease or no change. The respondent was asked to include all sources of earned income including any summer income earned while teaching in calculating the differential.

The last section of the TTI was an attempt to determine the circumstances that would be necessary to attract those persons who had left industrial education teaching back to this field of education. Again, the responses were reported and then categorized into six large groups. The groups were: would not return, competitive salary, competitive fringe benefits, smaller class size, larger budget, and other.

During the interviews, the interview schedule was used as a guide to make sure that the same information was asked of each person. The schedule was not used as a script. As the respondent replied to the various questions, notes were made in sufficient detail to assist the researcher in completing the write-up. Every effort was made to complete the write-up as soon as the interview was completed.

All public school districts that had been identified as offering some type of industrial education program at the seventh or higher grade level by the IEIS study were contacted during the last week of April and the first week of May, 1980. Twenty-six of those 61 districts or 43.3%, had one or more vacancies between January, 1979, and January, 1980. The total number of FTE vacancies in those 26 districts was 48. There had been one vacancy caused by death leaving

a total possible sample of 47 industrial educators. Of those 47 persons who had changed positions, it was possible to contact and complete the TTI with 34 for a response rate of 72.3%.

# CHAPTER 4

## INDUSTRIAL EDUCATION PROGRAMS, COURSE OFFERINGS, TEACHERS AND TEACHER TURNOVER

A Pilot Study was conducted during the 1978-1979 school year to develop and field test instruments and procedures. The data from the Pilot Study provided the base for a supplemental study to investigate teacher turnover and vacancies in industrial education for the two geographic areas of the Pilot Study. Each of these two studies are reported in this Chapter.

### Industrial Education Programs, Course Offerings, and Teachers

The Pilot Study for the Industrial Education Information System (IEIS) was conducted to determine how many public school districts in two representative regions of the State of Illinois offered industrial education programs at grade seven through twelve. The districts that offered industrial education programs were surveyed to determine the facilities and their capacities that were used to offer the programs, the number of teachers employed in those programs and the courses, grade level and frequency of the offering of those courses.

The Pilot Study was conducted in the Rockford and Peoria regions during the 1978-79 school year. The regions were chosen because they were believed to be representative of the remainder of the state in terms of community and school district make up. The school districts ranged from small rural districts with less than 500 students enrolled (K-12) through suburban and urban districts with enrollments exceeding 12,000 students. Each region included one of only twelve districts in the State that had enrollments of 12,000 or more students (Illinois State Board of Education, 1979). Most types of communities were included, from the rural, agriculturally oriented to the urban, heavy industrial centers dominated by corporations such as Caterpillar, Borg-Worner, Chrysler and Rockford Machine and Tool.

The Rockford region consisted of five counties: Boone, DeKalb, Ogle, Stephenson, and Winnebago. Forty public school districts, with grades seven and above, were identified in the region. Of the 40 public districts, 30 (75%) offered some type of industrial education program. All private and parochial districts in the region were included in the survey to determine the types and

the numbers of programs that were being offered in these districts. Twenty private districts were identified of which 2 (10%) offered industrial education courses (See Table 4.1). Because of the low incidence of programs in the private and parochial districts they will be reported only in the district information.

The Rockford region could be characterized as one which had a high proportion of K-12 districts; such districts were more likely to have industrial education programs. At the time of the survey, 75% of the districts were K-12 districts. The ten remaining districts of the region were K-8 districts of which three offered industrial education at the middle or junior high school level.

There were 172 teachers identified who taught at least one industrial education course in a public school. Four additional teachers were identified in the private/parochial schools.

The Peoria region presented a somewhat different picture as compared to the Rockford region. The Peoria region, which consisted of Fulton, Peoria, Tazewell, and Woodford counties, had a much higher percentage of K-8 districts, 59% of all districts in the region, which may account for the lower percentage of districts which offered programs (49%) (TABLE 4.1). The number of private/parochial schools in the Peoria region was equal to the number in the Rockford region, each had 20. Only one private/parochial school offered any courses in industrial education and that program was limited to drafting. This region had 152 industrial education teachers in the public schools; one teacher taught in the private/parochial schools.

The Rockford and Peoria regions had a total of 329 teachers teaching industrial education courses. There were 324 public school teachers and five teachers employed by private/parochial schools.

The total number of districts in the two regions was 141. Of the total, 101 of the districts were public and 40 districts were private/parochial. Sixty school districts or 59% of the public districts and three or 8% of the private/parochial districts offered some type of industrial education program in grade seven or above.

## Building/Attendance Centers

In those districts that offered industrial education programs, information was collected for each attendance center which housed students from grade seven

TABLE 4.1: NUMBER OF DISTRICTS, NUMBER AND PERCENT OF DISTRICTS WITH INDUSTRIAL EDUCATION PROGRAMS AND NUMBER OF INDUSTRIAL EDUCATION TEACHERS BY REGION AND COUNTY

| County | Total No. of Districts | | No. and % of Dist. with Ind. Ed. Programs | | | | Industrial Education Teachers | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Total Yrs Teaching[d] | | Years Teaching in Dist.[c,d] | | No. of Ind. Ed. Teachers | |
| | Public | Private | Public | | Private | | Range | Median | Range | Median | Public | Private |
| | N | N | N | % | N | % | | | | | N | N |
| **Rockford Region** | | | | | | | | | | | | |
| Boone | 2 | 2 | 2 | 100 | 0 | 0 | 1-23 | 12.5 | 1-23 | 9 | 10 | 0 |
| DeKalb | 10 | 0 | 8 | 80 | 0 | 0 | 2-32 | 12.5 | 2-24 | 10 | 34 | 0 |
| Ogle | 12 | 0 | 8 | 67 | 0 | 0 | 4-27 | 11.5 | 1-24 | 6.5 | 16 | 0 |
| Stephenson | 5 | 2 | 5 | 100 | 0 | 0 | 1-31 | 7 | 1-31 | 5 | 20 | 0 |
| Winnebago | 11 | 15 | 7 | 64 | 2 | 13 | 1-31 | 11.5 | 1-24 | 10.75 | 92 | 4 |
| Sub-Total | 40[a] | 20 | 30 | 75 | 2 | 10 | 1-32 | 10.67 | 1-24 | 10.44 | 172 | 4 |
| **Peoria Region** | | | | | | | | | | | | |
| Fulton | 13 | 0 | 7 | 54 | 0 | 0 | 1-25 | 14.5 | 1-25 | 5.75 | 19 | 0 |
| Peoria | 18 | 15 | 7 | 39 | 1 | 7 | 1-41 | 13.25 | 1-41 | 11.88 | 52 | 1 |
| Tazewell | 21 | 3 | 10 | 48 | 0 | 0 | 1-39 | 6.0 | 1-34 | 5.88 | 62 | 0 |
| Woodford | 9 | 2 | 6 | 67 | 0 | 0 | 1-29 | 5.17 | 1-27 | 2.88 | 19 | 0 |
| Sub-Total | 61[b] | 20 | 30 | 49 | 1 | 5 | 1-41 | 7.38 | 1-41 | 6.11 | 152 | 1 |
| TOTAL | 101 | 40 | 60 | 59 | 3 | 8 | 1-41 | 9.68 | 1-41 | 9.0 | 324 | 5 |

[a] Ten districts in the Rockford region were K-8 districts
[b] 36 districts in the Peoria region were K-8 districts
[c] Total years teaching in the district, may include teaching subjects other than industrial education.
[d] Range and Median based on known cases

and above. The information requested included the name of each industrial education teacher who taught one or more industrial education courses, the type and number of shops or labs available for those courses and the student capacity of each lab. Information was also requested about any part-time or evening industrial oriented courses that were offered at that attendance center (Appendix).

There were a total of 217 attendance centers with grades seven and above in the 101 public districts surveyed. In the Rockford region, there were 92 attendance centers. The Peoria region had 125 attendance centers (TABLE 4.2).

Industrial education programs were operated in 106 (48.8%) of the 217 attendance centers that housed students at the seventh or higher grade level. There were thirty-two attendance centers in one public school district in the Peoria region which did not offer industrial arts at the junior high/middle school level. This group accounted for 14.7% of the total number of attendance centers; if they had offered industrial arts, the percent of attendance centers with programs would have been 63.6%.

The extremely low number of programs in the private/parochial schools was evident in both regions. The preponderance of the private districts were K-8 districts (36 of the 40) and therefore less likely to have industrial education programs. The few private/parochial high schools which offered programs did not offer the variety of industrial education programs exhibited by the public districts. The typical industrial education offering by the private/parochial district was in the area of drafting. No private district reported more than one attendance center.

Table 4.3 displays data concerning the districts and attendance centers by level and the number of teachers by level and type of district. The number of districts and attendance centers shown on Table 4.3 are parallel to the districts and attendance centers shown on Table 4.2. The slight discrepancies between and within these tables are due to missing data.

A total of six of the 78 high school or combination junior and senior high school attendance centers did not offer an industrial education program. A total of 134 attendance centers was identified at the middle/junior high school level. There were 94 middle/junior high school attendance centers in the 61 districts that employed at least one industrial education teacher. Approximately one-third, 30 of the 94 middle/junior high attendance centers, actually offered an industrial education program. Eighteen of these attendance centers had a single teacher; eight had two teachers; three had three teachers and one

TABLE 4.2: DISTRICTS AND ATTENDANCE CENTERS WITH AND WITHOUT PROGRAMS BY DISTRICT ORGANIZATION AND REGION

| Dist. Organ. and Region | Districts | | | | | | Attendance Centers | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | With Prog. | | W/Out Prog. | | Total | | With Prog. | | W/Out Prog. | | Total | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Rockford Region: | | | | | | | | | | | | |
| K-8 | 1 | 3.3 | 8 | 80.0 | 9 | 22.5 | 1 | 1.6 | 8 | 27.6 | 9 | 9.7 |
| 9-12 | 3 | 10.0 | 0 | 0.0 | 3 | 7.5 | 3 | 4.8 | 0 | 0.0 | 3 | 3.3 |
| K-12 | 26 | 86.7 | 2 | 20.0 | 28 | 70.0 | 59 | 93.7 | 21 | 72.4 | 80 | 87.0 |
| Sub-Total | 30 | 100.0 | 10 | 100.0 | 40 | 100.0 | 63 | 100.0 | 29 | 100.0 | 92 | 100.0 |
| Peoria Region: | | | | | | | | | | | | |
| K-8 | 2 | 6.5 | 26 | 86.7 | 28 | 45.9 | 3 | 7.0 | 26 | 31.7 | 29 | 23.3 |
| 9-12 | 8 | 25.8 | 0 | 0.0 | 8 | 13.1 | 11 | 25.6 | 0 | 0.0 | 11 | 8.7 |
| K-12 | 21 | 67.7 | 4 | 13.3 | 25 | 41.0 | 29 | 67.4 | 56 | 68.3 | 85 | 68.0 |
| Sub-Total | 31 | 100.0 | 30 | 100.0 | 61 | 100.0 | 43 | 100.0 | 82 | 100.0 | 125 | 100.0 |
| TOTAL | 61 | 60.4 | 40 | 39.6 | 101 | 100.0 | 106 | 48.8 | 111 | 51.2 | 217 | 100.0 |
| TOTALS AND PERCENT BY DISTRICT ORGANIZATION | | | | | | | | | | | | |
| K-8 | 3 | 8.1 | 34 | 91.9 | 37 | 100.0 | 4 | 10.5 | 34 | 89.5 | 38 | 100.0 |
| 9-12 | 11 | 100.0 | 0 | 0.0 | 11 | 100.0 | 14 | 100.0 | 0 | 0.0 | 14 | 100.0 |
| K-12 | 47 | 88.7 | 6 | 11.3 | 53 | 100.0 | 88 | 53.3 | 77 | 46.7 | 165 | 100.0 |
| TOTAL | 61 | --- | 40 | --- | 101 | --- | 106 | --- | 111 | --- | 217 | --- |

TABLE 4.3: DISTRICTS AND ATTENDANCE CENTERS BY LEVEL, NUMBER OF TEACHERS AND TYPE OF DISTRICT

| Type of District | Dist W/Pgms | Middle/Junior High: No. of Teachers per Att Ctr 0 | 1 | 2 | 3 | 4 | Tot Tea | Tot Att Ctr | High Schools: No. of Teachers per Att. Ctr. 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Tot Tea | Tot Att Ctr | AVC No. AVC/Tea | TOTAL Tea | TOTAL Att Ctr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Districts with Programs** | | | | | | | | | | | | | | | | | | | | | | | | |
| Rockford 205 | 1 | | 1 | 3 | 2 | 1 | 17 | 7 | | 1[a] | | | 1 | 1 | 2 | | 1 | | | 30 | 6 | 1-18[b] | 65 | 14 |
| Peoria-150 | 1 | 32 | | | | | 0 | 32 | | 1[a] | | | | 1 | 3 | | | | | 24 | 5 | | 24 | 37 |
| **Urban/Suburban :** | | | | | | | | | | | | | | | | | | | | | | | | |
| Rockford Region | 5 | | 6 | 3 | | | 12 | 9 | | | | | 3 | 2 | 1 | | | | | 28 | 6 | | 40 | 15 |
| Peoria Region | 5 | | | 1 | | | 2 | 1 | | | | 1 | | | | 1 | 2 | 1 | 1 | 45 | 6 | 1-13 | 60 | 8 |
| **Rural:** | | | | | | | | | | | | | | | | | | | | | | | | |
| Rockford Region | 24[f] | 16 | 5 | 1 | 1 | | 10 | 23[d] | 1 | 11 | 6 | 4 | 4 | | | | | | | 51[c] | 26 | 2-14 | 67 | 51 |
| Peoria Region | 25[g] | 16 | 6 | | | | 6 | 22[d] | | 8 | 7 | 4 | | 2 | | | 1 | | 1 | 62[c] | 23 | 1-2[e] | 68 | 46 |
| Sub-Total | 61 | 64 | 18 | 8 | 3 | 1 | 47 | 94[d] | 1 | 21 | 13 | 9 | 8 | 6 | 6 | 1 | 4 | 1 | 2 | 240 | 72 | 5-47 | 324 | 171 |
| **Districts without Programs** | | | | | | | | | | | | | | | | | | | | | | | | |
| **Rural:** | | | | | | | | | | | | | | | | | | | | | | | | |
| **Rockford Region** | | | | | | | | | | | | | | | | | | | | | | | | |
| K-8 Dist | 8 | 8 | | | | | 0 | 8 | | | | | | | | | | | | | | | | 8 |
| 9-12 Dist | 0 | 0 | | | | | 0 | 0 | | | | | | | | | | | | | | | | 0 |
| K-12 Dist | 2 | 2 | | | | | 0 | 2 | 2 | | | | | | | | | | | | 2 | | | 4 |
| **Peoria Region** | | | | | | | | | | | | | | | | | | | | | | | | |
| K-8 Dist | 26 | 26 | | | | | 0 | 26 | | | | | | | | | | | | | | | | 26 |
| 9-12 Dist | 0 | 0 | | | | | 0 | 0 | | | | | | | | | | | | | | | | 0 |
| K-12 Dist | 4 | 4 | | | | | 0 | 4 | 4 | | | | | | | | | | | | 4 | | | 8 |
| Sub-Total | 40 | 40 | | | | | 0 | 40[d] | 6 | | | | | | | | | | | 0 | 6 | | | 46[d] |
| TOTAL | 101 | 104 | 18 | 8 | 3 | 1 | 47 | 134 | 7 | 21 | 13 | 9 | 8 | 6 | 6 | 1 | 4 | 1 | 2 | 240 | 78 | 5-47 | 324 | 217 |

[a] Special attendance center

[b] Read as: 1 AVC with 18 teachers

[c] Includes combined Jr and Sr High Schools; 5 in the Rockford Region and 6 in Peoria Region, also 2 cases where Jr. High students attend Ind. Ed. classes at the High School.

[d] Includes conservative estimates in some cases due to inadequate information.

[e] Contract program through ESR at Illinois Central College

[f] Includes: 19, K-12 Districts; 3, 9-12 Districts; 1, K-8 District and 1 AVC administered by an ESR

[g] Includes: 19, K-12 Districts; 4, 9-12 Districts; and, 2 K-8 Districts.

had four teachers. The other 64 middle/junior high school attendance centers where data were available had no industrial education teachers employed. In total, across the two regions, 134 middle/junior high school attendance centers were identified and 30 of those (22.4%) offered industrial education. In the great majority of cases, 18 of 30, a single teacher was employed at these attendance centers; 60% of all industrial education teachers at the middle/junior high school level were employed in single teacher settings.

At the high school, or combination junior high school/high school, 72 of the 78 attendance centers offered industrial education. At those 72 attendance centers at the high school level, 21, or 29.6%, were staffed by a single industrial education teacher. Thirteen attendance centers had two teachers, nine had three teachers, eight had four teachers, five had six teachers, and six others had six teachers. A total of eight attendance centers had more than six teachers.

Approximately 50% of the industrial education teachers were teaching at a location with three or less industrial education staff members and, in total, 37% of all industrial education programs were single teacher settings.

Forty-seven of the 324 teachers identified in the study, 14.5%, taught at the middle or junior high school and an equal percentage taught in the area vocational centers. The remainder, 71%, taught at the high school or combination junior high/high school attendance centers.

In total, the two regions had 217 attendance centers with grade seven and above in the 101 districts surveyed. The Rockford region differed from the Peoria region in having a higher percentage of K-12 districts. The K-12 districts and their attendance centers reported industrial education programs more often than the K-8 districts. While the number of attendance centers were near evenly split between the two regions, the percentage of attendance centers reporting industrial education programs was higher in the Rockford region. Almost 38% of the attendance centers in the Rockford region had industrial education programs as compared to 27% in the Peoria region. There were equal numbers of private/parochial attendance centers in the two regions with 20 each. The regions reported only three industrial education programs in private/parochial schools, the Rockford region had two and the Peoria region had one.

## Laboratories

Information regarding industrial education shops/labs was collected as

part of the attendance center information. The person who provided the information was requested to provide the name of each lab facility and its maximum student capacity. This information was coded with the IEIS code that most nearly matched the name provided. In cases where a lab was a multi-purpose facility, provisions were made for using two or three codes to more closely reflect the usage. Labs which were used for more than three areas were considered to be general shops and were coded as either junior or senior high general shops.

The capacity for 313 of 327 labs was reported for the 105 attendance centers. The range in student capacity was from 10 to 60, with a mode of 24. (See Table 4.4)

TABLE 4.4: STUDENT CAPACITY OF LABS AND FREQUENCY OF THAT CAPACITY

| Student Capacity | N | % |
|---|---|---|
| Less than 13 | 10 | 3.2 |
| 13-17 | 33 | 10.5 |
| 18-22 | 101 | 32.3 |
| 23-27[a] | 126 | 40.3 |
| 28-32 | 28 | 8.9 |
| 35-60 | 15 | 4.8 |
| TOTAL | 313 | 100.0 |

[a] Mode=24 with a frequency of 91

Fifty labs were in junior high or middle schools, 275 in high schools or area vocational centers. The remaining two labs were unspecified as to level when reported.

The most frequently reported lab was drafting with 10 at the junior high and 53 at the high school level. Table 4.5 gives a breakdown of labs by type, level, number, and percentage.

It should be noted that 63% of the reported labs were accounted for by the four main categories: drafting and related (19.9%); woodworking and related (15.6%); metalworking and related (15.3%) and auto and auto/power related (12.2%). General shops and combination facilities accounted for an additional 19.0%. The remaining 59 (18.0%) facilities were unit or general unit labs used for electricity, electronics, graphic arts, or other and unclassified programs.

TABLE 4.5: TYPE OF LABS BY LEVEL, NUMBER AND PERCENT

| Lab Type | Level: Jr/Middle Sch N | Jr/Middle Sch % | Sr HS/AVC N | Sr HS/AVC % | TOTAL N | TOTAL % |
|---|---|---|---|---|---|---|
| Drafting--General | 10 | 20.0 | 53 | 19.3 | 63 | 19.3 |
| Drafting Related[a] | | | 2 | .7 | 2 | .6 |
| Woods--General | 5 | 10.0 | 34 | 12.4 | 39 | 11.9 |
| Woods Related | | | 12 | 4.4 | 12 | 3.7 |
| Metals-General | 2 | 4.0 | 27 | 9.8 | 29 | 8.9 |
| Metals Related | | | 21 | 7.6 | 21 | 6.4 |
| Auto (Auto Mechanics)--General | | | 19 | 6.9 | 19 | 5.8 |
| Auto Related | | | 21 | 7.6 | 21 | 6.4 |
| Sub-Total | 17 | 34.0 | 189 | 68.7 | 206 | 63.0 |
| Combinations[b] | 7 | 14.0 | 11 | 4.0 | 18 | 5.5 |
| General Shop[c] | 24 | 48.0 | 21 | 7.3 | 44 | 13.5 |
| Sub-Total | 48 | 96.0 | 206 | 30.0 | 268 | 82.0 |
| All Other Subjects[d] | 2 | 4.0 | 47 | 20.0 | 59 | 18.0 |
| TOTAL | 50 | 100.0 | 253 | 100.0 | 327 | 100.0 |

[a] In all cases "Related" means similar or advanced facilities, e.g. Architectural Drafting and Mechanical Drawing or Auto Mechanics and Auto Body.

[b] Combinations where at least one of the four main subjects are taught

[c] Four or more areas taught in same facility

[d] Electricity, Electronics, Graphic Arts, Other.

## Vacancies

A primary focus of the IEIS study was to make a determination of the teaching areas that were experiencing turnover among industrial educators. To accomplish this, each district, as part of the district information form, was asked to provide information about each vacancy that had occurred from the 1977-78 to the 1978-79 school year. The vacancy was described in terms of teaching area, level, FTE and whether it had been filled or not filled by the start of the 1978-79 school year.

Although this question was included in the data collection form, there was reason to believe that all vacancies were not reported. In some cases the respondents interpreted the item to request information for "current vacancies". Therefore, the data concerning vacancies for 1977-78 to 1978-79 is likely to be reported as less than the actual.

Of the 60 public school districts with industrial education programs, 24 or 40.0%, reported one or more vacancies for the 1978-79 school year. Eight or 13.3% of these districts reported that they had not been able to fill the vacancy at the time of the survey.

Table 4.6 displays the tabulation of the total vacancies and vacancies not filled by teaching specialty and level for the two regions surveyed.

Eleven of the 40 vacancies reported (27.5%) remained unfilled throughout at least most of the following year.

The size of the industrial education program was investigated to determine whether this variable was related to industrial educators leaving their positions. It was suspected that rural districts, because of less adequate facilities and generally lower salaries, would experience a higher rate of turnover than urban or suburban districts. It was also suspected that the small rural districts would have a more difficult time recruiting teachers to fill their vacancies. Table 4.7 shows the tabulation of vacancies which were not filled for the 1978-79 school year. When the numbers of industrial education teachers and labs were used as indicators of the size of the program and the district, there did not seem to be indication that, during the 1978-79 recruiting period, the small, rural school districts were less likely to be able to fill an industrial education vacancy than the large districts.

TABLE 4.6: FTE VACANCIES AND VACANCIES NOT FILLED BY TEACHING SPECIALTY AND LEVEL[a]

| Teaching Specialty | Vacancies for Fall 1978 | | | | | Vacancies not Filled, Fall 1978[b] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Jr Hi | Jr/Sr Hi[c] | Sr Hi | AVC | Total | Jr Hi | Jr/Sr Hi[c] | Sr Hi | AVC | Total |
| Auto | | 1.0 | 9.0 | 1.0 | 11.0 | | 1.0 | 3.0 | | 4.0 |
| Woodworking | 1.0 | 0.5 | 5.0 | | 6.5 | | 0.5 | | | 0.5 |
| Metalworking | | 1.0 | 3.0 | 2.0 | 6.0 | | 1.0 | | | 1.0 |
| Jr/Sr Hi Gen Shop | 1.0 | 1.5 | 3.0 | | 5.5 | | 1.5 | | | 1.5 |
| Drafting | | 0.5 | 2.0 | | 2.5 | | 0.5 | | | 0.5 |
| Graphic Arts | | | 2.0 | | 2.0 | | | | | 0 |
| Electricity | | | 1.0 | | 1.0 | | | 1.0 | | 1.0 |
| Plastics | | 0.5 | | | 0.5 | | 0.5 | | | 0.5 |
| Building Trades | | | 1.0 | | 1.0 | | | | | 0 |
| Wood/Metals | | | 1.0 | | 1.0 | | | 1.0 | | 1.0 |
| Electronics/Welding | | | 1.0 | | 1.0 | | | | | 0 |
| Other Ind Ed | | | 1.0 | 1.0 | 2.0 | | | 1.0 | | 1.0 |
| TOTAL | 2.0 | 5.0 | 29.0 | 4.0 | 40.0 | 0 | 5.0 | 6.0 | 0 | 11.0 |

[a] 24 of the 60 (40.0%) public school districts with Industrial Education programs reported one or more vacancies.

[b] 8 of the 60 (13.3%) districts reported vacancies not filled.

[c] Includes 3 FTE's from one district.

TABLE 4.7: VACANCIES NOT FILLED BY SIZE OF PROGRAM, TEACHING SPECIALTY AND LEVEL

| Teaching Specialty of Vacancy not filled | Level | Size of Program: No. of Teachers Employed Fall '78 | Size of Program: No. of Labs |
|---|---|---|---|
| Rockford Region | | | |
| Automechanics | H.S. | 7 | 8 |
| Sm Engine Repair | H.S. | 7 | 8 |
| Electricity | H.S. | 66[a] | 59 |
| Automechanics | H.S.[b] | 4 | 2 |
| Woodworking | Jr-Sr[b] | 3 | 2 |
| Mech Drawing | Jr-Sr[b] | 3 | 2 |
| Plastics | Jr-Sr[b] | 3 | 2 |
| Foundry | Jr-Sr[b] | 3 | 2 |
| Automechanics | Jr-Sr[b] | 3 | 2 |
| Metalworking | Jr-Sr[b] | 3 | 2 |
| I. A. Gen Shop | Jr-Sr[b] | Unk. | Unk. |
| Peoria Region | | | |
| Shop Math | H.S.[c] | 1[d] | 3 |
| I. A. Gen Shop | Jr-Sr[c] | 0[d] | 2 |
| Automechanics | Jr-Sr[c] | 0[d] | 2 |
| Wood/Metal | H.S. | 3 | 4 |

[a] Rockford School District
[b] One district, 3 FTE's, programs dropped due to lack of teachers.
[c] One district, 1 FTE.
[d] No program at present due to financial situation.

## Individual Industrial Education Teachers

Each teacher who taught one, or more, industrial education class in grade seven or above was requested to fill out a personal information questionnaire. The information requested was intended to provide basic data about the teaching force. Name, age, number of years teaching industrial education, number of years teaching in the district, the type of teaching certificate held, intent to continue teaching industrial education, the primary and up to three secondary teaching specialties and percent time devoted to industrial education and other duties composed the requested baseline date (Appendix). The remainder of the requested information consisted of the teacher's industrial education teaching schedule. The data for these questions are reported in the section concerning courses.

The individual teacher form requested the year of birth and the intent to continue in teaching. Only the individual could provide the information concerning the intent; however, a supervisor or another teacher could provide all other information. In a number of cases it was not possible to get the information directly from the individual and the information was provided by a second person. Therefore, there is a higher percent of missing data for intent to continue in teaching and for age than for other variables.

The five counties in the Rockford region had a total of 172 teachers who taught one or more industrial oriented courses at the seventh or higher grade level. For those where the years of industrial education teaching experience was known, there was a range of 1 to 32 years with a median of 10.7 years. The teachers had a median of 10.4 total years teaching in the district where they were employed at the time of the survey.

There were 152 teachers in the four counties that comprised the Peoria region. The teaching experience of the known cases for this group had a range of 1 to 41 years, with a median of 7.4 years. The range of years teaching in the same district was also 1 to 41 with a median of 6.1 years. As a group, the teachers in the Peoria region tended to be somewhat less experienced and to have a shorter tenure in their current district than the Rockford group, but the lower tenure is a reflection of the large proportion of young teachers outside of the Peoria school district.

Age

Date of birth was available for 267 of the 324 teachers, 82.4%. See Table 4.7A. There was a relatively even distribution of teachers across all age groups. The youngest teacher was 23, and 21.0% of all teachers were 23 to 29. The largest group were 30 to 39 years old, 34.1%; 21.7% were 40 to 49; 19.5% were 50 to 59; and, 3.7% were 60 years old or older. The Peoria region had more younger and older teachers with fewer in the middle years than the Rockford region.

Calculations were also made separately for those teachers who taught industrial arts only, and those who taught at least one vocational course at the time of data collection. In general, the industrial arts teachers were a younger group than the vocational teachers; 23.5% of the industrial arts teachers were under 30 years of age compared to 16.8% of the vocational teachers.

The pattern of ages could indicate greater shortages of teachers in the future. There are only 61% as many teachers in the 23 to 29 age group as there are in the 30 to 39 age group. The younger teachers are also the ones who are most likely to leave teaching. In addition, the number of new graduates completing preparation for industrial education teaching has declined over 40% in the most recent eight years. This decline may be reflected in the current teachers' ages where only 14 teachers were 25 years old or less, 22 teachers were 26 through 28 years old and 20 teachers were 29 years old.

The 3.7%, 10 teachers, who are 60 years or over will soon be retiring; some had come out of retirement to "help out" by filling a vacancy on a temporary basis. An additional 24 teachers, 13.5%, were 55 to 59 years old; many of these could elect to take an "early retirement" under the provisions of the Illinois Statutes. New teachers are entering the field at a rate that will barely replace retiring teachers, even if all teachers remain in teaching; a total of 37 teachers are in their first or second year of teaching while 34 teachers are 55 years or older.

Industrial Arts and Vocational-Industrial Teachers

The type of courses taught was known for 323 of the 324 teachers. In Illinois a teacher may teach industrial arts only, both industrial arts and vocational education or only vocational industrial education. The data shown are for the actual class assignments at the time of data collection.

It is known that some teachers who were teaching only industrial arts at that time had taught vocational classes and could meet the Illinois requirements to teach vocational courses.

TABLE 4.7A: AGE OF INDUSTRIAL EDUCATION TEACHERS

| Teacher Group | AGE GROUP 23-29 N | % | 30-39 N | % | 40-49 N | % | 50-59 N | % | 60 and + N | % | Total N | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Peoria Region | 40 | 29.2 | 45 | 34.6 | 36 | 27.7 | 28 | 21.5 | 5 | 3.8 | 130 | 48.7 |
| Rockford Region | 16 | 12.3 | 46 | 33.6 | 22 | 16.1 | 24 | 17.5 | 5 | 3.6 | 137 | 51.3 |
| Voc. Teachers | 17 | 16.8 | 32 | 31.7 | 25 | 24.8 | 21 | 20.8 | 6 | 5.9 | 101 | 37.8 |
| IA Teachers | 39 | 23.5 | 59 | 35.5 | 33 | 19.9 | 31 | 18.7 | 4 | 2.4 | 166 | 62.2 |
| Total | 56 | 21.0 | 91 | 34.1 | 58 | 21.7 | 52 | 19.5 | 10 | 3.7 | 267 | 100 |

Vocational courses for purposes of this section of the study were coded as vocational by the responding teacher and enrollment in these courses was limited to students in grades 11 and 12. The latter criterion is consistent with Illinois DAVTE policy. DAVTE also reimburses courses at grade 10 at a lower rate as Vocational "orientation" courses. Many industrial arts courses at the junior high school and grades 9 and 10 receive a nominal reimbursement as career orientation courses. Due to the various levels and purposes of reimbursement, a great majority of all industrial education classes offered receive some reimbursement from DAVTE. Therefore, the criterion of whether or not a course is reimbursed or not will not distinguish between industrial arts and vocational classes. This situation also leads to confusion among teachers and other school personnel in distinguishing between industrial arts and vocational industrial education.

Table 4.7B displays the data concerning the teaching assignments of the teachers. A total of 186 of the 323 teachers, 57.6%, taught only industrial arts courses; 61, 18.9%, taught both industrial arts and vocational courses; and 76, 23.5% taught only vocational classes.

Years of Industrial Education Teaching Experience and Years Teaching in the District

When the years of industrial education teaching experience and years

teaching in the district were plotted as a frequency polygon, the tenure of the teachers became more apparent.

TABLE 4.7B: INDUSTRIAL ARTS AND VOCATIONAL TEACHERS BY REGION AND COUNTY

| | IA Only | | IA & Voc. | | Voc. Ind. Only | | Total | |
|---|---|---|---|---|---|---|---|---|
| Region/County | N | % | N | % | N | % | N | % |
| Peoria | | | | | | | | |
| Woodford | 10 | 52.7 | 3 | 15.8 | 6 | 31.5 | 19 | 5.9 |
| Fulton | 7 | 38.9 | 5 | 27.8 | 6 | 33.3 | 18 | 5.6 |
| Tazewell | 41 | 66.1 | 9 | 14.5 | 12 | 19.3 | 62 | 19.2 |
| Peoria | 29 | 60.4 | 15 | 31.2 | 4 | 8.3 | 48 | 14.9 |
| Sub-total | 87 | 59.2 | 32 | 21.8 | 28 | 19.0 | 147 | (45.5) |
| Rockford | | | | | | | | |
| Ogle | 14 | 87.5 | 2 | 12.5 | 0 | 0 | 16 | 5.0 |
| Stephenson | 11 | 44.0 | 4 | 16.0 | 10 | 40.0 | 25 | 7.7 |
| DeKalb | 15 | 48.3 | 4 | 13.0 | 12 | 38.7 | 31 | 9.6 |
| Boone | 2 | 20.0 | 6 | 60.0 | 2 | 20.0 | 10 | 3.1 |
| Winnebago | 57 | 60.7 | 13 | 13.8 | 24 | 25.5 | 94 | 29.1 |
| Sub-total | 99 | 56.2 | 29 | 16.5 | 48 | 27.3 | 176 | (54.5) |
| TOTAL | 186 | 57.6 | 61 | 18.9 | 76 | 23.5 | 323 | 100.0 |

The sample was sub-divided into four groups which were plotted separately. Rockford District 205 and Peoria District 150 represented the two large urban districts in the study. The urban/suburban group was identified as those districts that surrounded Rockford or Peoria or included a population center of 20,000 or more. The rural group were those districts that remained and were typically small in terms of student and teacher populations. The large districts, Rockford and Peoria, the urban/suburban group and the rural group each were approximately one-third of the total number of teachers identified as teaching industrial education courses in the regions surveyed.

Figure 1 and Table 4.9 show the distribution of total years teaching industrial education. Figure 2 and Table 4.8 show the distribution of years teaching in the district where employed at the time of the survey.

Rockford and Peoria were plotted separately because of the differences each exhibited. Peoria had a smaller staff in relation to student population than Rockford. This difference can be accounted for by the lack of industrial education programs below the high school level in Peoria. The Peoria district had 32 attendance centers with grades seven and eight that did not offer an industrial education program. If these attendance centers had offered industrial education courses with one teacher at each center, the teaching staff of Peoria

TABLE 4.8: YEARS TEACHING IN DISTRICT BY TYPE OF DISTRICT

| | Type of District | | | | | | | | | | Changes 79-80 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rockford 205 | | Peoria 150 | | Urban/ Suburban | | Rural | | TOTAL | | | |
| Years | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | 6 | 9.7 | 1 | 4.4 | 6 | 6.3 | 19 | 17.9 | 32 | 11.2 | 10 | 29.4 |
| 2 | 4 | 8.1 | | | 6 | 6.3 | 8 | 7.5 | 18 | 6.3 | 8 | 23.5 |
| 3 | 2 | 3.2 | 1 | 4.4 | 8 | 8.3 | 10 | 9.4 | 21 | 7.3 | 3 | 8.8 |
| 4 | 1 | 1.6 | 1 | 4.4 | 7 | 7.3 | 10 | 9.4 | 19 | 6.6 | 2 | 5.9 |
| 5 | 1 | 1.6 | | | 8 | 8.3 | 11 | 10.4 | 20 | 7.0 | 3 | 8.8 |
| 6 | 5 | 8.1 | 1 | 4.4 | 4 | 4.2 | 9 | 8.5 | 19 | 6.6 | 4 | 11.8 |
| 7-10 | 13 | 21.0 | 3 | 13.0 | 16 | 16.7 | 11 | 10.4 | 43 | 15.0 | 1 | 2.9 |
| 11-16 | 18 | 29.0 | 11 | 47.8 | 20 | 20.8 | 14 | 13.2 | 63 | 22.0 | 1 | 2.9 |
| 17-24 | 9 | 14.5 | 0 | 0.0 | 14 | 14.6 | 11 | 10.4 | 34 | 11.9 | 2 | 5.9 |
| 25+ | 3 | 4.8 | 5 | 21.7 | 7 | 7.3 | 3 | 2.8 | 18 | 6.3 | 0 | 0.0 |
| TOTAL | 62 | 100.0 | 23 | 100.0 | 96 | 100.0 | 106 | 100.0 | 287 | 100.0 | 34 | 100.0 |
| Changes 79-80 by type of dist. | 5 | 14.7 | 2 | 5.9 | 6 | 17.6 | 21 | 61.8 | --- | ----- | 34 | 100.0 |

TABLE 4.9: TOTAL YEARS TEACHING INDUSTRIAL EDUCATION BY TYPE OF DISTRICT

| | Type of District | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rockford 205 | | Peoria 150 | | Urban/ Suburban | | Rural | | TOTAL | | Changes 79-80 | |
| Years | N | % | N | % | N | % | N | % | N | % | N | % |
| 1 | 5 | 8.1 | 1 | 4.4 | 5 | 5.3 | 10 | 9.5 | 21 | 7.4 | 6 | 17.6 |
| 2 | 3 | 4.8 | | | 4 | 4.2 | 9 | 8.6 | 16 | 5.6 | 6 | 17.6 |
| 3 | 4 | 6.4 | | | 6 | 6.3 | 10 | 9.5 | 20 | 7.0 | 3 | 8.8 |
| 4 | 3 | 4.8 | 1 | 4.4 | 8 | 8.4 | 5 | 4.8 | 17 | 6.0 | 3 | 8.8 |
| 5 | 2 | 3.2 | | | 8 | 8.4 | 11 | 10.5 | 21 | 7.4 | 5 | 14.7 |
| 6 | 5 | 8.1 | | | 7 | 7.4 | 10 | 9.5 | 22 | 7.7 | 1 | 2.9 |
| 7-10 | 10 | 16.1 | 3 | 13.0 | 10 | 10.5 | 11 | 10.5 | 34 | 11.9 | 2 | 5.9 |
| 11-16 | 10 | 16.1 | 11 | 47.8 | 20 | 21.1 | 19 | 18.1 | 60 | 21.1 | 4 | 11.8 |
| 17-24 | 14 | 22.6 | 2 | 8.7 | 17 | 17.9 | 16 | 15.2 | 49 | 17.2 | 4 | 11.8 |
| 25+ | 6 | 9.7 | 5 | 21.7 | 10 | 10.5 | 4 | 3.8 | 25 | 8.8 | 0 | 0 |
| TOTAL | 62 | 100.0 | 23 | 100.0 | 95 | 100.0 | 105 | 100.0 | 285 | 100.0 | 34 | 100.0 |
| Changes 79-80 by type of dist. | 5 | 14.7 | 2 | 5.9 | 6 | 17.6 | 21 | 61.8 | --- | ----- | 34 | 100.0 |

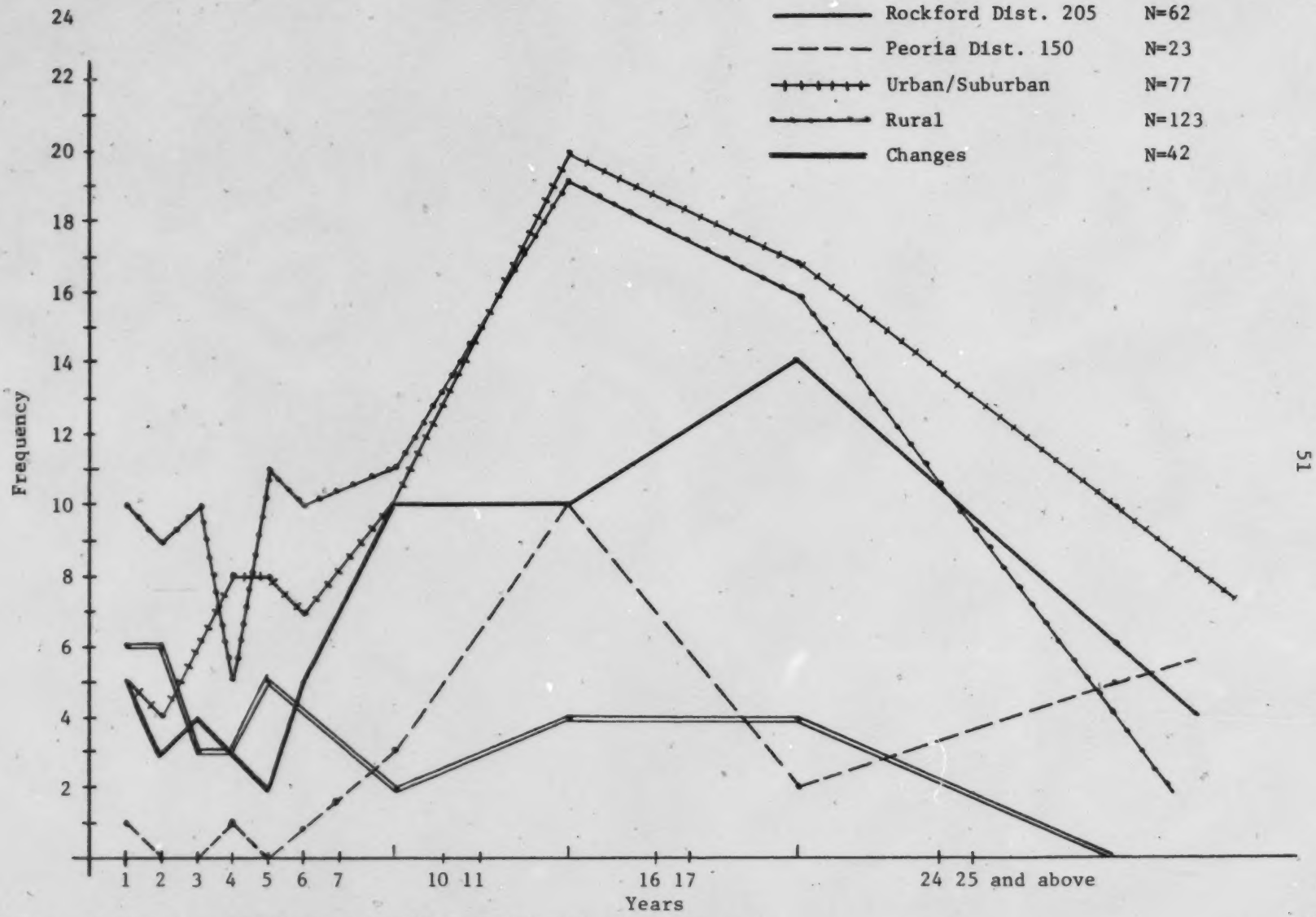


Figure 1: Total years teaching industrial education

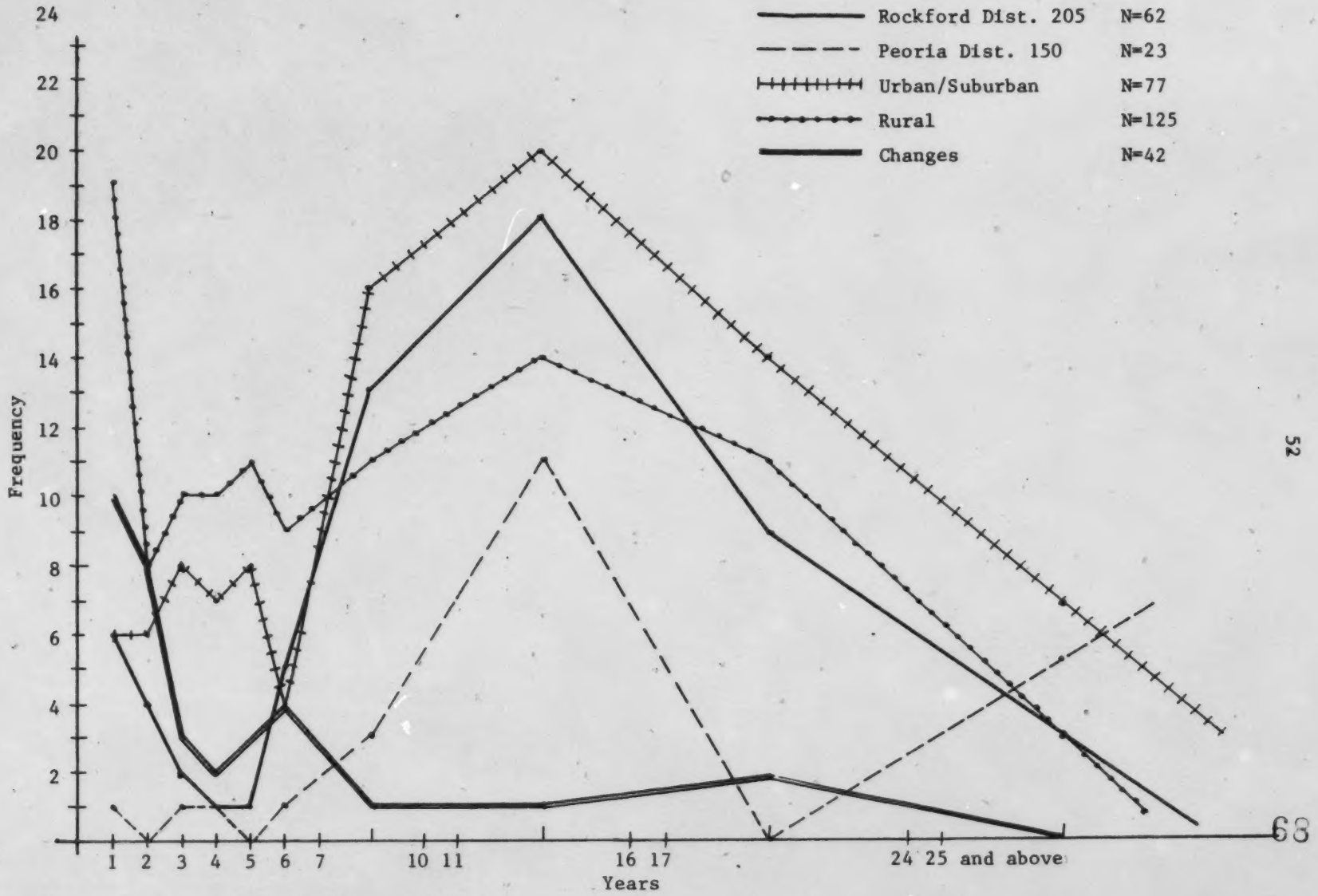


Figure 2: Years teaching in district

and Rockford would have been nearly equal in size.

One-half of the Rockford staff had 10 or less total years of industrial education experience while less than 25% of the Peoria staff fell in that category. The pattern for years teaching in the district and years of industrial education teaching experience was similar for the two districts. However, Peoria tended to have a staff with longer experience both in district and in industrial education than did Rockford.

The remainder of the measures, e.g., plans to stay in teaching, certification, assignment, were reviewed by region and found to have only minor variations between the two regions. Therefore, they have been merged and are reported as one group for the remainder of this section.

One of the aims of the IEIS study was an attempt to quantify future staffing needs due to retirement and resignation from industrial education teaching positions. The teachers were asked their intentions to continue teaching for the next five years. The results of the question are presented in Table 4.10 along with the results of the same question from the follow-up of university B.S. graduates (Tomlinson, 1980).

TABLE 4.10: PLANS TO STAY IN TEACHING

| | Pilot Study | | University Follow-up[a] | |
|---|---|---|---|---|
| Plans | N | % | N | % |
| Yes | 180 | 62.1 | 229 | 57.5 |
| No | 27 | 9.3 | 123 | 30.9 |
| Undecided | 83 | 28.6 | 46 | 11.6 |
| TOTAL | 290 | 100.0 | 398 | 100.0 |

[a] Tomlinson, 1980, p. 31.

The percentage of teachers who answered in both studies and planned to continue teaching did not differ greatly, 62.4 and 57.5% respectively. The "no" and "undecided" groups were quite different. This can be partially explained by the fact that the university follow-up group consisted of teachers who had only one to six years teaching experience. Persons within this range of experience have a history of high turnover. The teachers in the Rockford and Peoria regions had a much higher amount of teaching experience with medians of 10.4 and 7.3 years respectively. The responses from these more experienced groups showed a higher proportion who planned to continue in teaching. Overall, approximately 60% of the industrial education teachers planned to continue

teaching for the next five years. It was not possible to determine what portion of the group was planning for retirement and would thus have answered "no" on this basis. This omission was corrected in the questionnaire used in the next phase of the IEIS study.

The revised questionnaire provided four alternatives if the respondent planned not to continue teaching. The respondents were asked to specify what they intended to do after leaving teaching. The alternatives were: employment with business/industry, self employment, retirement and other.

The type of teacher certification each teacher held was tabulated. Approximately 75% held a regular Secondary 6-12 Certification and an additional 11% held the Special K-12 Certification. The certificates held by the 284 respondents who provided this information are reported in Table 4.11. Caution must be used when interpreting the numbers of persons who reported that they held a Provisional Vocational or a Temporary Provisional Vocational Certificate. Some respondents checked both a regular certificate plus one of the Vocational Certificates. Anyone holding a Secondary or Special Certification did not need a Provisional or Temporary Provisional Vocational Certificate to teach vocational classes in the State of Illinois. The majority of those respondents who indicated "other" and then wrote in the type of certificate indicated they held some type of administrative certificate.

TABLE 4.11: PRIMARY TYPE OF CERTIFICATION

| Type of Certification | N | % |
|---|---|---|
| Secondary 6-12 | 214 | 75.4 |
| Special K-12 | 31 | 10.9 |
| Provisional Vocational | 8 | 2.8 |
| Temp. Provisional Vocational | 1 | .3 |
| Other | 30 | 10.6 |
| TOTAL | 284 | 100.0 |

Over 65% of all teachers reported that 90-100% of their assignment was teaching industrial oriented subjects. The percent time by assignment is reported in Table 4.12. It is known that some of the teachers included in the IEIS study were primarily vocational agriculture teachers. Some of the courses that were typically included in their curriculum, e.g., welding, power mechanics, construction, were also considered to be industrial oriented in the definition used for the study. This combination accounted for some of the teachers who reported that over one-half of their assignment was spent teaching other

TABLE 4.12: NUMBER AND PERCENT TIME BY ASSIGNMENT FOR INDUSTRIAL EDUCATION TEACHERS

| | Percent Time Teaching Ind. Ed. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10% | | 11-24% | | 25-49% | | 50-74% | | 75-90% | | 100% | | TOTAL |
| Assignment | N | % | N | % | N | % | N | % | N | % | N | % | N |
| Part A:[a] | | | | | | | | | | | | | |
| Teaching Ind. Educ. | 3 | 1.0 | 14 | 4.7 | 15 | 5.0 | 22 | 7.5 | 50 | 16.5 | 199 | 65.7 | 303 |
| Part B:[b] | | | | | | | | | | | | | |
| Other Assignments for Those Not Teaching Ind. Educ. Full-Time | | | | | | | | | | | | | |
| Admin of Ind. Educ. | 7 | 36.8 | 7 | 33.3 | 4 | 21.1 | 3 | 14.3 | 0 | 0.0 | | | 21 |
| Teaching Other Subj. | 14 | 21.2 | 15 | 22.7 | 15 | 22.7 | 13 | 19.7 | 10 | 15.1 | | | 67 |
| Guidance | 4 | 44.4 | 0 | 0.0 | 2 | 2.2 | 3 | 33.3 | 0 | 0.0 | | | 9 |
| Other | 6 | 26.1 | 8 | 34.8 | 6 | 26.1 | 3 | 13.0 | 0 | 0.0 | | | 23 |
| TOTAL | 31 | (26.3)[c] | 30 | (25.0) | 27 | (22.9) | 22 | (18.3) | 10 | (8.5) | | | 120 |

[a] Part A=Number of persons that had at least some assignment teaching Ind. Educ.
[b] Part B=Number of assignments in addition to Ind. Educ. teaching, 104 of the 303 teachers had 120 assignments
[c] ( )=Percent of total assignments

subjects. Eighty-two percent, 249 of 303, spent 75% or more of their time teaching industrial subjects.

Very little time was allotted to the administration of industrial education programs by those who were also teaching in those programs. Only 14 or 4.6% of all respondents reported more than 10% of their assignment for administration. It appears that this function was performed as an additional assignment with less than 10% or no released time, or by their administrators within the district or attendance center who were not involved in the teaching of industrial education programs.

## Course Sections

All references to course section(s) must be interpreted in the manner used in this study. Determination of teaching load for teachers by a uniform index was found to be an almost impossible task. A "section" is defined as "a group of students taught" and number of sections was the number of different groups of students taught by one or more teacher(s).

A section, as reported herein, includes a wide range of specific scheduled class times; e.g., three 45-minute classes for six weeks in some junior high/middle schools to three clock hours per day for five days per week in vocational programs. At the extremes, one teacher met twelve different groups of students per week and changed groups each six weeks, while some vocational teachers have one group of students for three hours in the morning for the full year and another similar group in the afternoon. One Area Vocational Center, not included in the Pilot Study, uses individualized education plans for each student with differentiated staffing and has up to 150 students in a large laboratory.

Several attempts were made to find or develop an index that would provide an added degree of precision for indicating the teaching assignment of individuals and the extent of subjects taught. At this point a better index has not beer found, or developed.

## Courses

The information about the courses and sections of courses offered was obtained from the individual teachers. Each teacher was provided with an IEIS code list for industrial arts and vocational industrial courses. They were instructed to indicate their teaching load for the Fall term of the 1978-79

school year. However, since the study continued throughout the school year, the teachers were requested to indicate their "current" teaching schedule. The requested information was: course title(s), appropriate IEIS course code number(s), number of sections taught for each course, and grade level of students attending each section taught. Courses or sections were grouped into five levels beginning with seventh grade and ending with adult education. The five levels were: Jr. High/Middle school (7-9), Sr. High (9-10), Sr. High (9-12), Sr. High/AVC (11-12), and Adult Education including community college.

All returned questionnaire forms were edited and course codes compared with course name and grade level. In those cases where there was disagreement, e.g., a vocational course code had been used for a junior high industrial arts course, the code was changed to the more appropriate industrial arts code number. Courses were considered to be vocational when offered only for the eleventh, twelfth or adult education students and indicated to be vocational by the respondent.

The 324 teachers reported 96 different IEIS course titles a total of 774 times. The total number of sections reported to be taught for all 96 courses was 1474. The most frequently reported courses and sections of courses for industrial arts and vocational industrial education are given in Table 4.13. Totals and subtotals in Tables 4.14, 4.15, 4.16, and 4.17 may not be identical because of missing data.

One way to look at the courses taught is to note that the industrial arts courses were dominated by the areas of drafting (reported 104 times with 189 sections), woodworking (102 times with 192 sections), metalworking (61 times with 106 sections), and auto/power (45 times with 102 sections). The vocational industrial education courses were dominated by the areas of metalworking (reported 31 times with 55 sections), auto/power (26 times with 58 sections), and construction and building trades (22 times with 46 sections). These categories were determined by collapsing all related courses into one group, e.g., Drafting, Gen.; Mech. Drawing; Mech. Drawing II; and Arch. Drawing were collapsed into drafting.

The offerings of courses and sections were concentrated at the high school level. Just under 85% of all industrial courses were offered at this level. Table 4.14 displays a more detailed distribution of courses and sections of courses by grade level.

TABLE 4.13: NUMBER AND PERCENT OF MOST COMMONLY REPORTED COURSES AND SECTIONS OF COURSES BY INDUSTRIAL ARTS AND VOCATIONAL INDUSTRIAL EDUCATION

| | | No. of Times Reported | | | |
|---|---|---|---|---|---|
| | | Course | | Sec. of Course | |
| Rank | Course | N | % | N | % |
| Ind. Arts | | | | | |
| 1 | Gen. Woods | 75 | 12.3 | 149 | 12.6 |
| 2 | Drafting, Gen. | 66 | 10.8 | 138 | 11.7 |
| 3 | Sr. Hi Gen. Shop | 59 | 9.7 | 127 | 10.7 |
| 4 | Gen. Metals | 51 | 8.3 | 92 | 7.8 |
| 5 | Jr. Hi Gen. Shop | 35 | 5.7 | 120 | 10.1 |
| 6 | Electricity | 25 | 4.1 | 44 | 3.7 |
| 7 | Auto Mechanics | 23 | 3.8 | 59 | 5.0 |
| 8 | Power Mechanics | 22 | 3.6 | 43 | 3.6 |
| 9 | Graphic Arts | 19 | 3.1 | 32 | 2.7 |
| 10 | Woods II | 17 | 2.8 | 22 | 1.9 |
| 11 | Mech. Drawing | 16 | 2.6 | 23 | 1.9 |
| 12 | Electronics | 14 | 2.3 | 18 | 1.5 |
| 13 | Mech. Drawing II | 12 | 2.0 | 16 | 1.4 |
| 15 | Arch. Drawing | 10 | 1.6 | 12 | 1.0 |
| 15 | Machine Shop | 10 | 1.6 | 14 | 1.2 |
| 15 | Cabinetmaking | 10 | 1.6 | 21 | 1.8 |
| | Total most common Ind. Arts | 464 | 75.9 | 930 | 78.5 |
| | Total Ind. Arts | 611 | 100.0 | 1184 | 100.0 |
| Voc./Ind. Ed. | | | | | |
| 1 | Constr & Bldg Trades | 22 | 15.3 | 46 | 16.0 |
| 2 | Metals | 18 | 12.5 | 28 | 9.7 |
| 3 | Auto/Power/Diesel | 16 | 11.1 | 35 | 12.2 |
| 4.5 | Drafting | 11 | 7.6 | 19 | 6.6 |
| 4.5 | Graphic Arts | 11 | 7.6 | 15 | 5.2 |
| 7 | Welding | 10 | 6.9 | 23 | 8.0 |
| 6 | Ind. Coop Esp | 13 | 9.0 | 22 | 7.6 |
| 11.5 | Body & Fender | 4 | 2.8 | 9 | 3.1 |
| 8 | Auto Mechanics | 6 | 4.2 | 14 | 4.9 |
| 9.5 | Coop Work Training | 5 | 3.5 | 9 | 3.1 |
| 9.5 | Electronics | 5 | 3.5 | 8 | 2.8 |
| 11.5 | Architectural I | 4 | 2.8 | 6 | 2.1 |
| 14 | Electrical | 2 | 1.4 | 3 | 1.0 |
| 13 | Machine Shop | 3 | 2.1 | 4 | 1.4 |
| | Total most common Voc/Ind Ed | 130 | 90.3 | 241 | 83.7 |
| | Total Voc/Ind Ed | 144 | 100.0 | 288 | 100.0 |

TABLE 4.14: NUMBER AND PERCENT OF COURSES AND SECTIONS BY LEVEL

| Level | Courses | | Sections | |
|---|---|---|---|---|
| | N | % | N | % |
| Jr. Hi (7-9) | 94 | 12.1 | 264 | 17.9 |
| Sr. Hi (9-10) | 196 | 25.3 | 350 | 23.7 |
| Sr. Hi (9-12) | 181 | 23.4 | 389 | 26.4 |
| Sr. Hi/AVC (11-12) | 278 | 35.9 | 445 | 30.2 |
| Adult Educ. | 25 | 3.2 | 26 | 1.8 |
| TOTAL | 774 | 100.0 | 1474 | 100.0 |

Junior High/Middle School

General shop, drafting, and woods were the most commonly reported courses at the junior high/middle school level. Of the 94 courses offered by the teachers at this level, 35 were general shop which was offered in 120 sections. The three most frequently offered courses at this level, as shown by Table 4.15, comprised 60.0% of the total courses and 65.6% of the sections of courses offered at this level. Almost one-half (45.5%) of all course sections were of the general shop type.

TABLE 4.15: NUMBER OF MOST FREQUENTLY REPORTED COURSES AND SECTIONS FOR GRADES 7-9[a]

| Courses | Courses | | Sections | |
|---|---|---|---|---|
| | N | % | N | % |
| Jr. Hi Gen. Shop | 35 | 36.8 | 120 | 45.5 |
| Drafting | 11 | 11.6 | 21 | 8.0 |
| Woods | 12 | 12.6 | 32 | 12.1 |
| Career Exploration | 4 | 4.2 | 4 | 1.5 |
| Metals | 5 | 5.3 | 14 | 5.3 |
| TOTAL | 67 | 70.5 | 191 | 72.3 |

[a] Total courses = 95, Total sections = 264

High School

The course offerings showed the greatest amount of diversity at the high school level. Of the 774 courses reported, 660 were offered at the high school level in 1180 sections (TABLE 4.16). The most commonly reported course was general shop which was reported 58 times with 123 sections. This amounted to about 9% of the courses and 11% of the sections offered at the high school level.

TABLE 4.16: NUMBER OF MOST FREQUENTLY REPORTED IND. ARTS AND VOC. IND. COURSES AND SECTIONS FOR HIGH SCHOOLS AND AVC'S[a]

| | Grade 9-10[a] | | | | Grade 9-12 | | | | Grade 11-12/AVC | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Courses | | Sections | | Courses | | Sections | | Courses | | Sections | |
| Courses | N | % | N | % | N | % | N | % | N | % | N | % |
| Ind. Arts: | | | | | | | | | | | | |
| Sr. Hi Gen. Shop | 48 | 24.2 | 94 | 26.7 | 10 | 5.4 | 29 | 7.6 | | | | |
| Gen. Metals | 23 | 11.6 | 38 | 10.8 | 15 | 8.2 | 35 | 9.1 | 9 | 3.2 | 15 | 3.4 |
| Woods I | 23 | 11.6 | 47 | 13.4 | 24 | 13.0 | 51 | 13.3 | 11 | 4.0 | 16 | 3.6 |
| Drafting | 18 | 9.1 | 32 | 9.1 | 35 | 19.0 | 71 | 18.5 | 9 | 3.2 | 16 | 3.6 |
| Electricity | 13 | 6.6 | 23 | 6.5 | 6 | 3.3 | 13 | 3.4 | | | | |
| Power Mechanics | 10 | 5.1 | 20 | 5.7 | 2 | 1.1 | 8 | 2.1 | | | | |
| Graphic Arts | 9 | 4.5 | 16 | 4.5 | 6 | 3.3 | 12 | 3.1 | | | | |
| Woods II | 8 | 4.0 | 11 | 3.1 | 3 | 1.6 | 4 | 1.0 | | | | |
| Drafting II | 1 | 0.5 | 1 | 0.3 | 5 | 2.7 | 6 | 1.6 | | | | |
| Auto Mechanics | 4 | 2.0 | 7 | 2.0 | 13 | 7.1 | 41 | 10.7 | | | | |
| Voc. Ind.: | | | | | | | | | | | | |
| Constr. & Bldg. Trades | | | | | | | | | 22 | 7.9 | 46 | 10.4 |
| Metalworking | | | | | | | | | 18 | 6.5 | 28 | 6.3 |
| Auto/Power/Diesel | | | | | | | | | 16 | 5.8 | 35 | 7.9 |
| Ind. Coop. Exper. | | | | | | | | | 13 | 4.7 | 21 | 4.7 |
| Drafting | | | | | | | | | 11 | 4.0 | 19 | 4.3 |
| Graphic Arts | | | | | | | | | 11 | 4.0 | 15 | 3.4 |
| Welding | | | | | | | | | 10 | 3.6 | 23 | 5.2 |
| TOTAL | 157 | 79.3 | 289 | 82.1 | 119 | 64.7 | 270 | 70.5 | 130 | 46.8 | 234 | 52.6 |
| Total Offerings | 198 | 100.0 | 352 | 100.0 | 184 | 100.0 | 383 | 100.0 | 278 | 100.0 | 445 | 100.0 |

[a] Total reported courses at the high school level=660
Total reported sections of courses at the high school level=1180

The woodworking, metalworking, and drafting areas have historically dominated the subject matter offerings of industrial education. These areas also dominated in the programs surveyed. Woodworking or woodworking related courses comprised about 14% of the total courses and 19% of the total sections offered at the high school level. Metalworking and metalworking related courses comprised about 11% of the courses and 12% of the sections. Drafting accounted for about 12% of the courses and sections offered at the high school level. Thus, the three major areas plus "general shop" accounted for just under 50% of the courses and slightly over 50% of the sections at the high school level. Table 4.16 gives a more complete description of the most frequently reported courses and sections of courses at the high school level.

Adult Education

Although adult education was not a focus of the IEIS study, the teachers were asked to provide information about any additional part-time or evening courses they taught in addition to their regular full-time assignment. Due to the procedures used in the data collection, it is estimated that the reported adult education courses are substantially less than the actual offerings. The additional courses may have been taught as part of their full-time assignment or an additional part-time appointment in the same building as a part of their full-time assignment, a different building in the same district, or in another district or community college. There likely were teachers and courses that were not reported as adult education since reporting this information was not given particular emphasis.

The reported adult offerings of 25 courses and 33 sections represented 3.5% and 2.2%, respectively, of the total reported courses and sections. The respondent's choice of a vocational or an industrial arts course code was not questioned for the adult education courses. Of the 25 courses reported as adult education, 15 (60%) were reported with vocational code numbers. The same 15 vocational courses represented 20 (60%) of the 33 total sections of adult education. It was not possible, nor was it attempted, to determine if the students in the vocational courses were participating to satisfy a vocational or personal interest goal.

General woodworking was the most frequently reported course. The five most common courses comprised 52% of the courses and sections of adult education (TABLE 4.17).

TABLE 4.17: NUMBER OF MOST FREQUENTLY REPORTED COURSES AND SECTIONS FOR ADULT EDUCATION[a]

| Courses | Courses | | Sections | |
|---|---|---|---|---|
| | N | % | N | % |
| Gen. Wood | 5 | 20 | 5 | 15 |
| Auto/Power/Diesel | 3 | 12 | 3 | 09 |
| Welding | 2 | 08 | 2 | 06 |
| AC/Heat/Refrig | 2 | 08 | 2 | 06 |
| Drafting | 1 | 04 | 5 | 15 |
| TOTAL | 13 | 52 | 17 | 52 |

[a] Total courses = 25, Total sections = 33

Teacher Turnover and Vacancies - 1979-1980

## Building Vacancy Information

Phase two of the study focused on obtaining the data to answer questions pertaining to those districts and personnel that were involved in position changes since the data collection of the Pilot Study. The data collection focused on three areas: 1) the types of institutions and programs that experienced position changes and the results of those changes, 2) the characteristics of the industrial educators who were involved in position changes and the reasons they chose to make a position change, and 3) to what type of position did the teacher move upon leaving an industrial education teaching position.

The data collections for phase two of the study were carried out during the months of April, May, June, and July of 1980. At that time all public school districts that had been identified as having an industrial education program during the Pilot Study of the IEIS study were contacted by telephone. The Building Vacancy Information schedule (BVI) was used during the telephone interview of the administrator in charge of the industrial education program, e.g., department head, vocational director, principal, or superintendent. The interview was to determine whether there had been any change in the industrial teaching staff between January of 1979, and January of 1980. If there had been any change during that period, the BVI schedule was used as a guide to collect the information for the follow-up of the individual who had changed positions. The BVI was also designed to serve as a guide to collect information as to the current status of the industrial education program.

During this phase of the study there was a remarkable degree of co-operation by the respondents. Their candor in responding to the questions was gratifying as much as it was surprising. There was not one instance of an administrator refusing to answer the questions. When assured that the information was to remain confidential and not to be reported as coming from a particular school district, they often volunteered information that had not been requested. While this information was not requested, it was helpful in adding insight to understanding the situation that was the cause or result of the position change. In general, the administrators were not optimistic about the supply of industrial education teachers. Most mentioned their difficulty in recruiting a replacement for a departed teacher.

There were 60 districts contacted during the follow-up study. Of the 60 districts, 26 reported that they had one or more changes in the industrial education teaching staff during the period of January, 1979, and January, 1980. One district reported that they had been able to fill a position which had been vacant for the previous school year. The remaining 34 school districts had not experienced a change in their industrial education teaching staff.

Those districts which reported vacancies were compared with the list of districts that had reported vacancies the previous year. Seventeen (65.6%) of the districts reported having vacancies in the industrial education teaching staff both years. The district that had spent a year securing a replacement had an additional vacancy during the target period of this study. Twelve of the districts that had reported vacancies in both years reported the same teaching area (IEIS code) as being vacant in both years. It was not possible to determine in all cases if the actual position was the same in both cases but it is known that five of the cases did involve the same position becoming vacant two years in succession. In one case the building principal commented that the current industrial arts teacher was the third teacher in four years.

There were 48 FTE vacancies reported by the 26 districts. One district, Rockford, reported five vacancies, one area vocational center (AVC) reported four, two districts reported having three vacancies, eight districts reported having two vacancies and 17 districts had one each. There were 18 vacancies in the industrial arts areas and 29 vacancies in the vocational industrial areas. Table 4.18 gives the breakdown of the vacancies by specialty and level for industrial arts and vocational industrial education.

Industrial arts had the most vacancies in the areas of general shop (6), with woodworking and metalworking next with four each. The majority of the vacancies, 11 of 18, (62.2%) for the industrial arts area were concentrated at the high school level.

There were five vacancies among the 47 positions (10.6%) at the middle/junior high school level, 31 vacancies of 240 high school positions (12.9%) and 11 vacancies for the 47 area vocational center positions (23.4%). Eighteen of the 31 vacancies (58.1%) at the high schools were for teachers of vocational courses, while the remainder were for industrial arts. In total, 29 of the 47 changes (61.7%) involved vocational positions.

There were higher vacancy and turnover ratios for Vocational positions than for industrial arts positions; a total of 42.4% of all teachers taught at least one vocational course but 61.7% of all vacancies involved positions where at

TABLE 4.18: FTE VACANCIES BY LEVEL AND SPECIALTY FOR INDUSTRIAL ARTS AND VOCATIONAL INDUSTRIAL EDUCATION

| Specialty | Jr Hi/Middle | Jr/Sr Hi | High School | AVC | Total |
|---|---|---|---|---|---|
| Ind. Arts | | | | | |
| Gen Shop | 3 | 1 | 2 | | 6 |
| Drafting | | | 1 | | 1 |
| Electricity | | | 1 | | 1 |
| Power/Auto | | | 1 | | 1 |
| Graphic Arts | | | 1 | | 1 |
| Woodworking | 1 | 1 | 2 | | 4 |
| Metalworking | 1 | | 3 | | 4 |
| Sub Total | 5 | 2 | 11 | | 18 |
| Voc. Industrial | | | | | |
| Drafting | | | 2 | 1 | 3 |
| Elec/Elect | | | | 1 | 1 |
| Power/Auto | | 1 | 6 | 3 | 10 |
| Graphic Arts | | | 1 | 2 | 3 |
| Construction | | 1 | 2 | 1 | 4 |
| Woodworking | | | 2 | | 2 |
| Metalworking | | 1 | 1 | 3 | 5 |
| Ind. Co-op | | | 1 | | 1 |
| Sub Total | | 3 | 15 | 11 | 29 |
| TOTAL | 5 | 5 | 26 | 11 | 47[a] |

[a]One additional vacancy was created by the death of a teacher.

least one vocational course was taught. The vocational areas showed the most vacancies in the areas of power and automotive . Just over half of the vocational vacancies (51.7%) were at the high school level.

The rate of turnover for the period of January, 1979, to January, 1980, was 14.8%, 48 FTE's for 324 positions as identified in the Pilot Study. There was one vacancy as a result of a death. There was one program, three FTE's, closed during the same period "for lack of industrial arts teachers." The previous year the same district had reported having three FTE vacancies which they were eventually able to fill for the 1978-79 school year. When interviewing the superintendent, he reported that all three teachers had quit at the end of that school year. When the superintendent was asked for the current addresses of the former teachers, he reported that they had left none and that their I.R.S. W-2 forms had been returned marked "No Forwarding Address" by the Postal Service. Therefore, it was not possible to trace any of the three to find out what the situation was from their perspective.

The three teachers just mentioned were among 13 (27.7%) of the 47 teachers who would not have been re-hired in contracts or tenure would not have been a factor. The reasons given for not re-hiring centered around teaching competency and lack of ability to work with students.

At the time of the Building Vacancy Information (BVI) interview there were 11 positions that were still vacant. Seven of these positions were vocational industrial positions, 24.1% of the vacancies, and the remaining four positions were industrial arts positions, 22.2% of the vacancies. Table 4.19 gives a more detailed description of the changes for industrial arts and vocational industrial education and whether the vacancies were filled or not filled. All analyses of phase two will be on the basis of known information, therefore, the base for the information will vary from an N of 34 to an N of 47.

TABLE 4.19: CHANGES FOR INDUSTRIAL ARTS AND VOCATIONAL INDUSTRIAL EDUCATION, FILLED AND NOT FILLED BY LEVEL

| | | Ind. Arts | | Voc. Ind. Educ. | |
|---|---|---|---|---|---|
| Level | Changes | Filled | Not Filled | Filled | Not Filled |
| Jr Hi/Middle | 5 | 4 | 1 | | |
| Jr/Sr Hi | 5 | 2 | | | 3 |
| High School | 26 | 8 | 3 | 14 | 1 |
| AVC | 11 | — | — | 8 | 3 |
| TOTAL | 47 | 14 | 4 | 22 | 7 |
| | | 77.8% | | 75.9% | |

The decision to classify the vacancy as industrial arts or vocational industrial was made by the answer given by the respondent during the BVI interview. If the respondent replied that the previous teacher was teaching in a reimbursed vocational program, the position was considered to be vocational. All positions at the AVC level were considered to be vocational. No positions at the junior high/middle school level were considered to be vocational.

There were 47 unit (K-12) districts of which 19 (40.4%) reported vacancies. Five of the 11 high school (9-12) districts (45.5%) and one of three elementary (K-8) districts (33.3%) reported one or more vacancies. All of the AVC's reported one or more vacancies.

The size of the districts was looked at to determine whether this factor had any relationship to an industrial educator leaving a teaching position. When the Average Daily Attendance (ADA) of the districts was listed it was found that 29 of the districts or 48.3% of the total districts, had an ADA of less than 999. Those same districts had 75 or 25.1% of the teaching positions and 24.0% of those positions experienced a change in personnel. This turnover rate was approximately double that of the total sample. Only one other category experienced a rate of change that exceeded the 14.5% rate of the sample. The category that exceeded the turnover rate of the sample did so by only 3.7% and does not appear to be anything more than a slight abnormality. Table 4.20 shows the distribution of the vacancies by the size of the districts as determined by their ADA. It does appear that there is a pattern of teachers leaving industrial education teaching positions in the smallest school district as determined by their ADA. The small schools tended to have a higher turnover of teachers.

Another factor thought to have an influence on teachers leaving a position would be the financial factor. One element of this factor would be the operating expenditures per pupil. It could be assumed that the higher the expenditure per pupil the less likely the teacher would be to leave a position because of a lack of supplies, equipment, or financial reward. This did seem to be the case in this study. When the operating expenditures per pupil were listed in order, it was found that those districts which had an expenditure below the median had more teachers leave than those from districts above the median. The median expenditure was $1,578.00 per pupil. In the 29 districts across the nine counties that spent below that amount there were 16 vacancies in 96 positions or one per 8.0 teaching positions. The districts that spent more than the median amount had 31 vacancies in 224 positions or one per 7.2 teaching positions. Therefore, the per pupil expenditure does appear to have a slight relationship to an ind-

TABLE 4.20: NUMBER AND PERCENT OF DISTRICTS, DISTRICTS WITH VACANCIES AND VACANCIES BY AVERAGE DAILY ATTENDANCE

| ADA | Tot. Dist. In Study | | No. Dist. With Vac. | | Tot. Vac. | | Tot. Ind. Ed. Tea. | | % Pos. Vac. |
|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | |
| 0-999[a] | 29 | 48.3 | 11 | 42.3 | 18 | 38.3 | 74 | 23.1 | 24.0 |
| 1000-1999[b] | 17 | 28.3 | 5 | 19.2 | 6 | 12.7 | 74 | 22.8 | 8.1 |
| 2000-2999[c] | 3 | 5.0 | 2 | 7.7 | 5 | 10.6 | 45 | 13.9 | 11.1 |
| 3000-3999 | 3 | 5.0 | 2 | 7.7 | 3 | 6.4 | 22 | 6.8 | 13.6 |
| 4000-4999[d] | 2 | 3.3 | 2 | 7.7 | 2 | 4.3 | 11 | 3.4 | 18.2 |
| 5000-5999 | 1 | 1.7 | 1 | 3.8 | | | 8 | 2.5 | |
| 7000-7999 | 1 | 1.7 | 1 | 3.8 | 2 | 4.1 | 11 | 3.4 | 9.1 |
| 18,000 | 1 | 1.7 | 1 | 3.8 | 2 | 4.3 | 24 | 7.4 | 8.3 |
| 30,000 | 1 | 1.7 | 1 | 3.8 | 5 | 10.6 | 65 | 20.1 | 7.7 |
| TOTAL | 60 | 100.0 | 26 | 100.0 | 43[c] | 91.5 | 324 | 100.0 | 14.5 |

[a]includes 2 9-12 districts with 3 vacancies and 13 teachers
[b]includes 2 9-12 districts with 3 vacancies and 13 teachers
[c]includes 1 9-12 district with 2 vacancies and 24 teachers
[d]includes 1 K-8 district with 1 vacancy and 3 teachers
All other districts with vacancies are K-12 districts

ustrial educator leaving a teaching position but, this relationship does not appear to be differential according to the type of district, e.g., K-8, 9-12, K-12. Table 4.21 lists the number of districts and vacancies by per pupil expenditure.

TABLE 4.21: NUMBER OF DISTRICTS AND NUMBER OF VACANCIES BY PER PUPIL EXPENDITURE

| Expenditure | No. Dist. | No. Vac. | No. Ind. Teach. | % Pos. Vac. |
|---|---|---|---|---|
| $1200-1299 | 1 | 1 | 1 | 100.0 |
| 1300-1399 | 7 | 6 | 26 | 23.1 |
| 1400-1499 | 11 | 3 | 38 | 7.9 |
| 1500-1578 | 10 | 6 | 37 | 16.2 |
| Sub Total | 29 | 16 | 96 | 16.7 |
| 1579-1699[a] | 9 | 11 | 37 | 29.7 |
| 1700-1799 | 6 | 11 | 97 | 11.3 |
| 1800-1899 | 6 | 2 | 38 | 5.3 |
| 1900-1999 | 4 | 5 | 40 | 12.5 |
| 2000-2099 | 3 | 2 | 11 | 18.2 |
| 2300-2399 | 1 | | 1 | 0 |
| Sub Total | 29 | 31 | 224 | 13.8 |
| TOTAL | 58 | 47 | 324 | 14.5 |

Median = $1578.00

[a] Includes 4 teachers and 4 vacancies at an ESR Area Vocational Center

Another measure of a school district was the size of its industrial education program as determined by the number of teachers assigned to the program per attendance center. As part of this measure the vacancies were viewed by level in relation to the number of teachers per level. The largest percentage of vacancies for this measure occurred at the AVC's with 23.4% of the positions becoming vacant. The AVC's had 47 (14.5%) of the total teaching positions. The high school and combination junior/senior high school was the level with the next highest percentage of positions vacant with 13.5%.

When the size of the program as reflected by the number of teachers per attendance center was used as a measure, those buildings with three teacher programs experienced the highest percentage of positions vacant. The three teacher group had 36 teachers and 27.8% of those teachers made position changes. The one teacher programs had 3[illegible] teachers for a 23.3% vacancy ratio. The four

teacher programs were the next highest of this measure with 20.0% of the teaching positions vacated. The two teacher programs and those programs with five or more teachers were the most stable of the five groups with 4.5 and 12.0% of the teaching positions experiencing a change.

When both level and size of program were considered it appears that the high schools and combination junior/senior high schools with three teacher programs were the most likely to experience a teacher change. One-third of the teachers in this group made a position change. There was one other group that exceeded 33% but, because there was only one attendance center in this group it does not appear that a relationship can be made to a teacher leaving a position. Table 4.22 lists the number of teachers and vacancies per attendance center by level.

TABLE 4.22: NUMBER OF TEACHERS AND VACANCIES PER ATTENDANCE CENTER BY LEVEL

| Level | | Total Tea./Vac. | No. of Tea. per Attend. Cent. 1 | 2 | 3 | 4 | 5 and above |
|---|---|---|---|---|---|---|---|
| Jr. Hi./Middle | Tea. | 47 | 18 | 8 | 3 | 1 | |
| | Vac. | 5 | 3 | | 1 | 1 | |
| Hi. School and Comb. Jr/Sr Hi. | Tea. | 230 | 21 | 13 | 9 | 8 | 20 |
| | Vac. | 31 | 4 | 2 | 9 | 3 | 13 |
| AVC | Tea. | 47 | | 1 | | 1 | 3 |
| | Vac. | 11 | | | | 4 | 7 |
| Total Vacancies | | 47 | 7 | 2 | 10 | 8 | 20 |
| Percent | | 100 | 14.9 | 4.3 | 21.3 | 17.0 | 42.6 |
| Total Teachers | | 324 | 30 | 44 | 36 | 40 | 165 |
| Percent | | 100 | 12.0 | 13.6 | 11.1 | 12.3 | 50.9 |
| Percent Vacancies | | | 23.3 | 4.5 | 27.8 | 20.0 | 12.1 |

Recruiting Methods

During each BVI interview the administrator was asked the methods the district used to recruit new teachers for the industrial education vacancy. The most common method was through university placement offices. Of the 47 vacancies, 27 were listed with placement offices in Illinois. Many of the districts also listed their industrial education vacancies with university placement offices in the surrounding states. In this case 20 of the vacancies were list-

ed with placement offices in Wisconsin, Iowa, Indiana, and Missouri. One administrator reported that his district had listed the vacancy with placement offices in 10 states besides Illinois.

Other methods of recruiting were "word of mouth" used by 14 districts, newspaper advertising used by five districts and "other" used by six districts. The "other" category included contacting persons who had applied for positions previously, offering the position to a student teacher who had been assigned to the building during the previous year and recruiting the college student member of the Department of Adult, Vocational and Technical Education evaluation team that had been in the district during the previous school year.

In those cases where the origin of the application was known for the successful candidate, the most successful recruiting was the university placement offices. Thirteen of the 29, where the source was known, were recruited from this source. Only two of these cases were known to have been recruited from outside the State of Illinois. The second most common source of new teachers was "word of mouth" advertising through the teaching staff, with eight recruits, followed by the "other" category, mentioned earlier, with six recruits. Two districts were able to recruit a replacement for a vacant position through newspaper advertising. No districts used professional journals as a means of recruiting. Vocational teachers were more likely to be recruited from the local area and industrial arts through university placement offices.

It was possible to determine the previous experience of 36 of the teachers recruited to fill industrial education vacancies. There were two main sources of new teachers reported. Beginning teachers who were graduates of Illinois universities having industrial teacher education programs accounted for 10 (27.8%) of the recruits. The group that was recruited with Temporary Provisional and Provisional Vocational Teaching Certificates from non-teaching employment also numbered 10. There were six certified teachers recruited from non-teaching employment, four experienced teachers from other districts in Illinois, three experienced teachers from within the same district and one experienced teacher recruited from outside the state. The two remaining teachers were retired teachers who were hired on a temporary basis until a permanent full-time person could be found.

Twenty-three of the 48 position changes, 47.9%, were filled by teachers with less than full certification, temporary hires or were still vacant at the time of the interview. In the programs where the eleven positions were not filled the courses were discontinued until a teacher could be found in two dist-

ricts. The program was dropped permanently in one district (3 FTE's) and six districts reported that the remaining staff members were teaching the courses of the former teacher as an overload.

Several districts were able to fill vacancies by assigning teachers, with the necessary qualifications, from other subject areas. One program was changed to a craft program and taught by the art teachers within the district. Another district hired a former member of the vocational advisory committee. One area vocational center filled an industrial electricity position by hiring the electrician who had done the electrical maintenance for the facility.

## Teacher Telephone Interview

The Teacher Telephone Interview was conducted during the months of June and July of 1980. By August 1, 1980, it had been possible to interview 34 or 73.9%, of the 47 teachers that had left an industrial education teaching position between January, 1979, and January, 1980. It was not possible to contact the remaining teachers due to a lack of a follow-up address or no answer at the follow-up address which was provided by the school administrators where previously employed.

As was the case with the administrators during the BVI interviews, the teachers proved to be very cooperative. In the cases where the former teacher was contacted at his new place of employment, he was very willing to take the time to answer the questions in detail. It appeared that those contacted at work were in positions which allowed them the freedom of time to talk on the telephone without fear of antagonizing their supervisor. Those who were contacted at home were equally willing to answer the questions asked of them during the interview.

An interview schedule was developed for use during the interview of teachers who had left an industrial education teaching position. The Teacher Telephone Interview (TTI) schedule was used as a guide to assure that the same information was obtained from each subject. The average interview lasted approximately 17 minutes. The shortness of the interview was aided by the availability of the information sheet that the subject had completed the previous year as part of the IEIS study. The information when carried forward to the time of the interview made it possible to proceed without the need to collect much of the demographic data. The previous contact with the individual also lessened the need for a long introductory explanation of the objectives of the survey. When

the previous survey was referred to, most everyone remembered having filled out their Individual Information Form. Thus, the interviews proceeded smoothly with little apparent discomfort for the subject.

## Demographic Characteristics of the Subjects

### Age

At the time of the follow-up it was possible to determine the ages of 38 of the 47 persons who had left an industrial education teaching position. The range of ages was from 23 to 55 years with a mean of 31.9 and median of 28.3 years. Table 4.23 shows the frequency distribution of the ages of the subjects at the time of the follow-up. It should be noted that 55.3% of the subjects were 30 or less years of age. Assuming that the new teacher will be a minimum of 22 years of age, just over one-half of this group had a maximum of eight years of teaching time before making a change. Thirty-nine percent of the subjects interviewed were between 29 and 39 years of age. There were no subjects in the 40 to 44 year age bracket. The remaining 13% of the subjects were in the 45 to 55 year bracket. (Table 4.23).

TABLE 4.23: FREQUENCY DISTRIBUTION OF AGE AT TIME OF FOLLOW-UP INTERVIEW

| Age | Freq | % | Cum % |
|---|---|---|---|
| 23-24 | 4 | 11.8 | 11.8 |
| 25-26 | 6 | 17.6 | 29.4 |
| 27-28 | 7 | 20.6 | 50.0 |
| 29-30 | 3 | 8.8 | 58.8 |
| 31-32 | 4 | 11.8 | 70.6 |
| 33-34 | 2 | 5.9 | 76.5 |
| 35-39 | 3 | 8.8 | 85.3 |
| 45-49 | 3 | 8.8 | 94.1 |
| 50-55 | 2 | 5.9 | 100.0 |

N=34 Median=28.5 Mean=31.88

Therefore, one-half of those who made a position change were 28 years old or less as shown in Table 4.23, while only 13.5% of all teachers were in this age group. This means that those persons who are 28 years old or less are 3.7 times more likely to change than those who are over 28 years.

Marital Status

Twenty-seven of the subjects were married at the time of the interview, seven were single. Of the 27 married subjects, 19 had children. The number of children ranged from 1 to 4 with 10 (37%) having 2 children. There were 35 children among the 19 subjects, 13 pre-school age, 10 elementary school age and four each in the junior high, high school and college age groups. The high number of children below junior high age, 65.7%, should be noted; the subjects had chosen to make a change while they had the responsibility of a family with young children.

Years of Work and Teaching Experience

Years of experience were looked at as three different variables; years of industrial education teaching experience, years teaching in the school district before the position change was made, and years of full-time industrial work experience.

Industrial Education Teaching Experience: The total industrial education teaching experience of the 41 persons who changed positions ranged from one to twenty-three years. The mean of the group was 6.4 years and the median was 4.2 years. Almost 37% of the group had two or less years of industrial education teaching experience, 68.3% had five years or less, and 78.0% had 10 years or less experience. Table 4.24 shows the frequency distribution for total years of industrial education teaching experience for the cases where the information for each of those who changed positions and for all teachers in the two regions of the Pilot Study. Teachers with two years or less of total industrial education teaching experience comprised only 13.0% of all teachers but 36.6% of all position leavers. In fact, it can be estimated that approximately 40.5% of all first and second year teachers left their teaching positions. Teachers with five years or less comprised 33.3% of all teachers but 68.3% of all teachers who left a teaching position. The early years of teaching, especially the first two years, result in a highly disproportionate ratio of teachers who change positions.

While it might be expected that an industrial education teacher's potential professional teaching career might be expected to approach 35 years, from age 22 to age 57, only 26.0% of all teachers were found to have more than 16 years

of experience and 8.8% had over 24 years.

TABLE 4.24: FREQUENCY DISTRIBUTION OF TOTAL YEARS INDUSTRIAL EDUCATION TEACHING EXPERIENCE

| | Persons with Changed Positions | | | All Teachers in Regions | | |
|---|---|---|---|---|---|---|
| Years | N | % | Cum % | N | % | Cum % |
| 1 | 8 | 19.5 | 19.5 | 21 | 7.4 | 7.4 |
| 2 | 7 | 17.1 | 36.6 | 16 | 5.6 | 13.0 |
| 3 | 3 | 7.3 | 43.9 | 20 | 7.0 | 20.0 |
| 4 | 4 | 9.8 | 53.7 | 17 | 6.0 | 26.0 |
| 5 | 6 | 14.6 | 68.3 | 21 | 7.4 | 33.4 |
| 6 | 1 | 2.4 | 70.7 | 22 | 7.7 | 41.1 |
| 7-10 | 3 | 7.3 | 78.0 | 34 | 11.9 | 53.0 |
| 11-16 | 5 | 12.2 | 90.2 | 60 | 21.1 | 74.1 |
| 17-24 | 4 | 9.8 | 100.0 | 49 | 17.2 | 91.3 |
| 25 + | 0 | 0.0 | 100.0 | 25 | 8.8 | 100.0 |
| | 41 | | | 285 | 100.0 | 100.0 |

Median=4.2 Mean=6.4

Teaching in Last School District: The number of years of teaching in the last school district before the position change was made ranged from one to twenty-three years. The mean for the group was 4.1 years and the median was 2.4 years. Over 52% of the group had two or less years with the last district, 77.3% had five or less, and 93.2% had ten or less years. Table 4.25 shows the frequency distribution of the 41 respondents where the number of years of teaching in the last school district was known. As was true when the teaching experience was analyzed, the first two years of teaching in the district were the most critical in terms of teacher turnover.

Teachers with two or less years in their last district comprised 17.5% of all teachers and 52.3% of those who changed positions. Approximately 46.0% of all teachers change positions after one or two years after taking a position in a district. Of all teachers, 40.2% have more than 10 years experience in their district.

When total years of teaching and years of teaching in the last district were merged, the first three years of each dimension contained 41.1% of those who made changes. Of that group, 9 of 14 (64.3%) left education. The remainder of the total group which had more than three years of teaching split equally between those who stayed in education and those who left education. Therefore, when a person made a position change about one-half left education, except, for the early years when two-thirds left education.

TABLE 4.25: FREQUENCY DISTRIBUTION OF YEARS TEACHING IN LAST DISTRICT

| | Persons with Changed Positions | | | All Teachers in Regions | | |
|---|---|---|---|---|---|---|
| Years | N | % | Cum % | N | % | Cum % |
| 1 | 16 | 36.4 | 36.4 | 32 | 11.2 | 11.2 |
| 2 | 7 | 15.9 | 52.3 | 18 | 6.3 | 17.5 |
| 3 | 3 | 6.8 | 59.1 | 21 | 7.3 | 24.8 |
| 4 | 4 | 9.1 | 68.2 | 19 | 6.6 | 31.4 |
| 5 | 4 | 9.1 | 77.3 | 20 | 7.0 | 38.4 |
| 6 | 4 | 9.1 | 86.4 | 19 | 6.6 | 45.0 |
| 7-10 | 3 | 6.8 | 93.2 | 43 | 15.0 | 60.0 |
| 11-16 | 1 | 2.3 | 95.5 | 63 | 22.0 | 82.0 |
| 17-24 | 2 | 4.5 | 100.0 | 34 | 11.9 | 93.9 |
| 25 + | 0 | 0.0 | 100.0 | 18 | 6.3 | 100.0 |
| | 44 | | | 287 | 100.0 | 100.0 |

Median=2.4 Mean=4.1

Full-time Industrial Work Experience: The respondents were asked the number of years of full-time equivalent industrial work experience they had at the time of the interview. Of the 34 persons interviewed, 28 responded that they had some full-time industrial work experience, six had no industrial work experience. The range reported was from zero to eighteen years with the mean being 3.2 years and the median being 2.1 years. Table 4.26 shows the frequency distribution of the full-time industrial work experience of the 34 respondents. The years of work experience are concentrated heavily below five years with the group of zero to five including 88.2% of the sample. Only four persons had more than five years of full-time industrial work experience as compared to the six persons that had zero years of full-time industrial work experience. Therefore, the group could be characterized as relatively young with two or less years of teaching industrial education in total and in the last district. Furthermore, they likely have two or less years of full-time industrial work experience.

At the time the respondents were reporting the number of years of full-time industrial work experience they were asked to identify the type of work they had done. The type of work was coded using the IEIS code developed for the vocational industrial areas. Table 4.27 shows the frequency distribution of those responses. The two most common types of work experience reported by those having industrial work experience was metalworking and construction followed in third place by automobile mechanics.

TABLE 4.26: FREQUENCY DISTRIBUTION OF YEARS OF INDUSTRIAL WORK EXPERIENCE

| Years | Freq | % | Cum % |
|---|---|---|---|
| 0 | 6 | 17.6 | 17.6 |
| 1 | 6 | 17.6 | 35.3 |
| 2 | 8 | 23.5 | 58.8 |
| 3 | 2 | 5.9 | 64.7 |
| 4 | 4 | 11.8 | 76.5 |
| 5 | 4 | 11.8 | 88.2 |
| 6-7 | 1 | 2.9 | 91.2 |
| 8-10 | 1 | 2.9 | 94.1 |
| 10-13 | 1 | 2.9 | 97.1 |
| 14-18 | 1 | 2.9 | 100.0 |

N=34 Median=2.1 Mean=3.2

TABLE 4.27: AREAS OF FULL-TIME WORK EXPERIENCE

| Area | N | % |
|---|---|---|
| General | 1 | 3.6 |
| Electrical | 2 | 7.1 |
| Electronics | 1 | 3.6 |
| Auto Mech. | 4 | 14.3 |
| Graphics | 3 | 10.7 |
| Aviation | 1 | 3.6 |
| Metalworking | 8 | 28.6 |
| Construction | 6 | 21.4 |
| Other | 2 | 7.1 |
| TOTAL | 28 | 100.0 |

Industrial Education Teaching Specialty

The primary industrial education teaching specialty of each respondent was recorded from the Individual Form filled out the previous year as part of the Pilot Study of the IEIS study. Where possible, at the time of the interview this information was verified with the respondent. As part of the verification process the respondent was asked if the teaching specialty was industrial arts or vocational industrial education. Table 4.28 shows the results of that inquiry. Twenty-two (57.4%) of the respondents considered their teaching specialty to be industrial arts, the remaining 16 (42.1%) considered their teaching specialty to be vocational industrial education. Metalworking and woodworking were the most common teaching specialties of the 38 known cases.

TABLE 4.28: TEACHING SPECIALTIES FOR INDUSTRIAL ARTS AND VOCATIONAL INDUSTRIAL EDUCATION

| | Ind. Arts | | Voc. Ind. | | Total | |
|---|---|---|---|---|---|---|
| Specialty | N | % | N | % | N | % |
| Gen. Shop | 3 | 7.9 | | | 3 | 7.9 |
| Drafting | 1 | 2.6 | 3 | 7.9 | 4 | 10.5 |
| Elec/Elect | 2 | 5.3 | | | 2 | 5.3 |
| Graphic Arts | 2 | 5.3 | 2 | 5.3 | 4 | 10.5 |
| Metalworking | 6 | 15.8 | 3 | 7.9 | 9 | 23.7 |
| Woodworking | 8 | 21.1 | | | 8 | 21.1 |
| Automotive | | | 5 | 13.2 | 5 | 13.2 |
| Bldg. Trades | | | 3 | 7.9 | 3 | 7.9 |
| TOTAL | 22 | 57.9 | 16 | 42.1 | 38 | 100.0 |

The respondents were asked the type of teaching certificate they were entitled to in the State of Illinois. Thirty-six (87.8%) reported that they taught with a Secondary (6-12) Teaching Certificate. Of the remaining persons, two taught with a Special (K-12) Teaching Certificate, two taught with a Temporary Provisional Vocational and one taught with a Provisional Vocational Certificate.

The areas of metalworking, woodworking, and automotive were the most commonly reported areas of industrial work experience and teaching specialty implying that those who had work experience most likely had it in the area of their teaching specialty.

Current Employment

The current employment of those teachers that had made a position change was one of the primary focuses of the follow-up study. Through the Teacher Telephone Interviews it was possible to determine how 34 of the 47 teachers that had made position changes were employed. At the time of the interviews there were 13 persons employed by business/industry and 4 were self-employed in industrial related occupations. There were 14 persons still in education related occupations, 11 teaching industrial education in another district or building in the same district, 2 in educational administration, and 1 was completing a graduate degree and anticipating returning to the classroom. One had entered the ministry on a full-time basis, one was unemployed, and one had retired and was employed in sales. Thus 17 or 50.0%, had left teaching for employment in business and industry, 14 or 41.2%, remained in education as either teachers or ad-

ministrators, and 3 or 8.8%, were retired, in other occupations, or unemployed.

Employment in Education

The fourteen people that remained in education remained primarily in industrial education. Eleven of the teachers had moved to another school district to teach industrial education. Of the 11, three had moved to other states, including one that was teaching at a university in Kansas, one was teaching at a community college, and one was completing a graduate degree in industrial education at a university in Illinois. Of the three teachers that had remained in the same district, one was teaching industrial education in another building and two had moved into administration. One of the administrators had been promoted to Director of Vocational and Driver Education for one of the largest districts in the study. Thus, only one of the industrial education teachers that remained in education was not involved in industrial education programs as a teacher or administrator.

Employment in Business or Industry

A total of 13 teachers had left industrial education teaching for employment in business or industry. This group was asked for the type of employment in which they were currently involved. Four responded that they were involved in sales, three were in management or supervisory roles, two were working as technicians, and one was working as a skilled tradesman. The three remaining were in various other roles such as technical writer for an aero-space manufacturer, materials agent for a contractor, and a property manager for a large savings and loan corporation.

As a means of assessing the value of the training for teaching industrial education, outside the educational job market, the respondents were asked to rate the importance of their industrial education technical and professional training in getting their new job. The respondents were asked to respond on a scale of one to five with one being Unimportant and five being Necessary. Only one person thought that the technical portion of their training was Unimportant while three thought that the technical training was Necessary. The mean for the 13 respondents was 3.7 and the mode was 4, equating to this portion of their training as being very important in their success in obtaining their new position. Table 4.29 shows the frequency distribution of the responses for this

question.

This group of respondents did not perceive their professional education training as being as important in their pursuit of non-educational employment as was the technical training. Using the same scaling as the previous question, the results were almost reversed. Only one person considered the professional training as being Necessary, while three considered this portion of their training as Unimportant. The mean for the 13 respondents was 2.4 and the mode was 2 equating to this portion of their training as being Somewhat Important in their success in obtaining their new position. Table 4.29 shows the frequency distribution of the responses for this question.

TABLE 4.29: IMPORTANCE OF INDUSTRIAL EDUCATION TECHNICAL AND PROFESSIONAL TRAINING IN NON-EDUCATIONAL EMPLOYMENT

| | | Business/Industry | | Self-Employment | |
|---|---|---|---|---|---|
| | | Tech. | Prof. | Tech. | Prof. |
| Importance | | N | N | N | N |
| Necessary | (5) | 3 | 1 | 2 | 1 |
| Very Important | (4) | 5 | 3 | | |
| Important | (3) | 2 | 1 | 1 | |
| Somewhat Important | (2) | 1 | 4 | 1 | |
| Unimportant | (1) | 1 | 3 | | 3 |
| | | 13 | 13 | 4 | 4 |
| Mean | | 3.7 | 2.4 | 3.75 | 2.0 |
| Mode | | 4 | 2 | 5 | 1 |

How the respondents obtained their new jobs was another of the questions pursued as part of this study. A part of the question was whether the teacher or the employer initiated the job search. Of the 13 cases only three of the teachers were approached by the new employer with a job offer. Two of these cases developed out of part-time work with that employer. The third case developed from an application that had been filed with the new employer two years earlier. The 10 remaining subjects initiated the job search with their new employer. Eight of the ten had no previous professional contact with their new employer, while two had worked part-time for their new employer before pursuing a full-time position.

Self-Employment

Four persons had left industrial education teaching to start their own

businesses. In one case two teachers from the same school resigned and bought a farm implement dealership, thus being involved in sales and service. Of the two remaining teachers one was selling insurance and the other owned a tool rental business. None of the subjects had developed their business from previous part-time or summer work.

This group was also asked to rate the importance of their industrial education technical and professional training in relation to their new businesses. Their responses were scaled in the same manner as the persons employed by business and industry. The technical aspect of their training was rated as Necessary by two of the respondents, Important by one, and Somewhat Important by one. The professional training was rated as Necessary by one respondent and Unimportant by three. Table 4.29 gives the frequency distribution of the responses to these questions.

Retirement

One teacher had retired from industrial education teaching and was currently selling used cars in a western state. This person was receiving a pension from the state retirement system and working full-time in his brother's business. His reason for retiring at the time he did was given as "financial." At the time of the interview he was equalling his teaching salary from the commissions he received from his sales. The commissions plus his pension gave him a net gain of income that was attractive enough to convince him to retire "early." This respondent perceived his industrial education technical training as being Somewhat Important in his new job. His industrial education professional training was rated as being Very Important because of the need for dealing with people.

There were two former teachers that were not classified in any of the categories previously mentioned. One had finished a divinity degree that he pursued while teaching and was a full-time minister. While this person rated his industrial education technical training as being Unimportant, he did rate his professional training as being Very Important again because of working with people as part of his ministry.

The one remaining person who had made a position change was unemployed at the time of the interview. He was living in a western state looking for a teaching or industrial job. When this person was teaching in Illinois he had held a Temporary Provisional Vocational Teaching Certificate. At the time of the

interview he was several courses short of graduation and was attempting to complete the courses and transfer them back so that he could obtain certification to teach in his state of current residence.

Reasons For Changing Positions

This section of the interview schedule dealt with the two extremes of the satisfaction and dissatisfaction of teaching industrial education at the secondary level. The first question dealt with those aspects of the teaching job which the respondent enjoyed the most. In the case of those who had left the classroom the wording was "what they missed most about teaching industrial education." If they had more than one response they were asked to rank their responses.

The most common first response was "working with students." This response was given by 17 or 58.6%, of the 29 persons who were no longer teaching industrial education. "Having the summer off" was the next most common first response given by 4 (13.8%) of the respondents. The third most common response was "having access to the machinery in the shop for my personal use." This response was given twice (6.9%) by the 29 respondents. Other responses that were given and ranked first by the respondents were: having control over the classroom, having activity-type classes, the technical aspects of the subjects as compared to other subjects taught in the schools and the extra curricular activities.

"Working with the faculty" and "the opportunity to be creative" were the two most frequently mentioned aspects of teaching that were given as the second response. Each was given twice (18.2%) by the 11 persons giving more than one response. "Working with students" was given once as a second response along with "job security", "the variety in teaching", and "having summers off." Some of the other second responses given were "use of the machinery", "extra curricular activities", and "salary."

Only three persons gave a third response to the question of what they most liked about teaching. These responses, each given once, were: "working with students", "working with the administration", and "dealing with the technical aspects of the subject matter."

To determine those factors that contributed to dissatisfaction with industrial education teaching the respondents were asked what they least missed or liked about teaching industrial education. Again they were asked to rank their response if they had more than one. There were 28 first responses, 22 second, and 9 third responses to this question. Ten (35.7%) of the respondents ranked

highest their dissatisfaction with the salary and fringe benefits they had received from teaching. In addition, 20 of the 28 persons who responded reported dissatisfaction with the salary and fringe benefits. The second most common first response related to problems with the administration. This response was given six times (21.4%) and was followed by "problems with students" given five times (17.9%). "Extra assignments" and "low program budgets" were given as least liked or missed factors two times each. Other factors mentioned once as first responses were: the restrictive structure of the class time schedule, using the "shop classes" as the dumping ground for low or under achievers, the pressure of teaching and student apathy towards learning.

The second responses were also led by those that were unhappy with the salary and fringe benefits of public education. This was given as a second response by five or 22.7% of the persons making second responses. "Low program budgets" was also given five times as a second response. "Administrative problems" was given three times (13.6%) followed by "extra assignments" given two times. Factors mentioned one time were: "student problems", "poor teaching facilities", "community problems", "low faculty attitude of industrial education and agriculture", "extra work required at night" and "parents did not realize the problems their children were having or causing."

Nine persons gave a third response. Again the most common was the salary and fringe benefit factor given five times (55.6%). The remaining responses each given one time were: "Administrative problems", "low program budgets", "other people using shops" and "parents looking at the schools as a babysitting service."

The predominant factors that contributed to the satisfaction of the former industrial education teachers were "working with students", "having summers off", and "having access to the machinery for my personal use". The first two have traditionally been factors that have made teaching attractive. The third is a factor that could be considered unique to industrial education.

The areas that caused the greatest amount of dissatisfaction were monetary factors, problems with the administration, and problems with students. All three have been areas which have been well documented in previous research as related to teacher turnover.

Gross Income Differential

The gross annual income differential of those teachers who changed positions

was considered to be a major question to be answered by the study. The respondents were asked if they had a change in their gross annual income between the salary paid them during the 1978-1979 school year and their salary for 1979-1980. Each response was categorized as an increase, decrease or no change. For the 34 persons who responded there were five that reported decreases in salary, six with no change and 23 who reported increases. Table 4.30 gives the distribution of the gross annual income differential for the 34 respondents.

TABLE 4.30: FREQUENCY DISTRIBUTION OF GROSS INCOME DIFFERENTIAL BETWEEN INCOME IN 1978-79 AND 1979-80

| Income Differential | Decrease | No Change | Increase |
|---|---|---|---|
| 0 | | 6 | |
| $ 1 - 999 | 1[d] | | |
| 1,000 - 1,999 | 1[d] | | 2 |
| 2,000 - 2,999 | | | 1 |
| 3,000 - 3,999 | | | 5 |
| 4,000 - 4,999 | | | 1 |
| 5,000 - 5,999 | | | 2 |
| 6,000 - 6,999 | | | 2 |
| 7,000 - 7,999 | 1[e] | | 3 |
| 8,000 - 8,999 | | | 1 |
| 9,000 - 9,999 | 2[c] | | 1 |
| 10,000 - 10,999 | | | 2 |
| 11,000 - 11,999 | | | 1 |
| 12,000 +[a] | | | 2 |
| | 5 | 6 | 23[b] |

[a] One Respondent reported an increase of $50,000.

[b] Data based on 34 respondents of the 47 teachers who changed positions.

[c] Includes one who returned to graduate school and one temporarily unemployed.

[d] Moved to live closer to "home" for personal preference and actual reduced expenses for increased usable income.

[e] Moved to rural area for desired life style.

It should be noted that two of the five respondents who reported decreases were not employed at the time of the interview. One was a full-time graduate student and the other was unemployed while he was attempting to complete his degree and certification requirements. These were also the two respondents that reported decreases of over $9,000. The two respondents who reported decreases of less than $3,000 stated that they had a net increase in income because of living closer to home, thus saving substantially on commuting expenses and also living where the cost of living was lower. The one remaining respondent reporting a decrease had chosen to move to a rural area of Nebraska. The move was made to re-

turn to the area of his family origins and also to remove his children from the influence of the urban schools, which he viewed as negative.

Those who reported no change in income included two industrial educators who remained in the same district and on the same salary schedule. Two of the remaining four reporting no change were self-employed in a new business which had the potential of much greater financial reward in the future.

The group that reported an increase in gross annual income comprised 67.6% of the respondents. The range of their reported increase was $49,000, with the lowest being $1,000 and the highest being $50,000. Because the $50,000 report exceeded the next highest increase by $35,000 it was not used in any calculations of means or distributions.

The mean increase of the remaining 22 persons reporting increases was $6,204 with the median being $6,000. The mode of $3,500 was strongly influenced by the four teachers who changed districts and reported increases of $3,500. When the persons who remained in education and reported increases (8) were parceled out, their mean increase was $3,389. The maximum raise reported for this group was $5,500. When the distributions of the increases for those in education (Table 4.31), were compared with those who moved to business, industry or self-employment (Table 4.32) it becomes more obvious that those who left education made much larger gains than those who remained in education.

The smallest gain reported by those in business and industry was $3,500. The largest increase was $15,000. The smallest gain for the group in education was $1,500 and the largest gain was $5,500. As Table 4.32 shows, 50% of the group in business and industry reported increases in excess of $8,000 while no teacher reported a gain in excess of $6,000.

TABLE 4.31: FREQUENCY DISTRIBUTION OF INCOME INCREASE BY THOSE REMAINING IN EDUCATION

| Income Increase | Freq | % | Cum % |
|---|---|---|---|
| $ 1,000 - 1,999[a] | 2 | 22.2 | 22.2 |
| 2,000 - 2,999 | 1 | 11.1 | 33.3 |
| 3,000 - 3,999 | 4 | 44.4 | 77.8 |
| 5,000 - 5,999 | 2 | 22.2 | 100.0 |

[a] Includes 1 teacher that moved to administration in the same District.

TABLE 4.32: FREQUENCY DISTRIBUTION OF INCOME INCREASE BY THOSE EMPLOYED IN BUSINESS AND INDUSTRY

| Income Increase | Freq | % | Cum % |
|---|---|---|---|
| $ 3,000 - 3,999 | 1 | 8.3 | 8.3 |
| 4,000 - 5,999 | 1 | 8.3 | 16.7 |
| 6,000 - 6,999 | 2 | 16.7 | 33.3 |
| 7,000 - 7,999 | 2 | 16.7 | 50.0 |
| 8,000 - 8,999 | 1 | 8.3 | 58.3 |
| 9,000 - 9,999 | 1 | 8.3 | 66.7 |
| 10,000 - 10,999 | 2 | 16.7 | 83.3 |
| 11,000 - 14,999 | 1 | 8.3 | 91.7 |
| 15,000 - 15,999 | 1 | 8.3 | 100.0 |
| | 12[a] | | |

[a] One additional increase was a full-time minister

Changes Required to Attract Teachers Back to the Classroom

The final section of the interview with those teachers who had made position changes was concerned with those factors that would have to change before they would consider returning to the industrial education classroom. The question was asked only of those persons who had left the classroom. Those teachers who were teaching industrial education at another district or another building in the same district were not asked the question. Thus, the two industrial educators who had moved to an administrative position were included in the group that was asked this question.

Of the 34 persons who were interviewed, 20 were asked "Under what circumstances would you consider returning to teaching industrial education?" Seven or 35% of the 20 responded that they would not return under any circumstances. Of the seven who stated that they would not return, three had eight or more years of industrial education teaching experience. The four remaining had three or less years of experience.

The financial factor, salary and fringe benefits, was the response of nine of the subjects or 45%. Several of the comments offered as part of this response were: wife no longer has to work for us to survive (employed by industry with a $7,500 increase); would like to teach at a high school or community college where the salary was competitive with industry; was forced to work part-time greasing trucks to supplement my income (increased income $10,000 working as a mechanic for a landscaping firm).

The four remaining responses were varied and were grouped under the "other"

category. The responses which tended to reflect the dissatisfaction of this group were:

1. Only if I had control over what is being taught.
2. If there were graduate programs in technical areas so I can advance on the salary schedule.
3. Only at the community college or university level, there are too many student and administrative problems at the secondary level.
4. If construction industry dries up.

Some of the additional comments which were offered on this question were: . . . .desperation, cannot afford to teach, more potential in the insurance business (now self-employed), certain subject areas should be able to demand more salary (differential salary schedules), and student standards need to be higher (dumping ground syndrome).

As the closing portion of the interview, the subjects were asked to evaluate their decision to make position change. There were no respondents who stated that they regretted having made the move. One respondent was in the process of looking for another teaching position because the program was being dropped as a result of a decision by the board of education to terminate a joint agreement with another district. He stated that he was looking for another teaching position. The remaining subjects appeared to be very satisfied with their new positions. Several commented that they wish they had made the change sooner.

## Program Changes

Each of the 61 districts with an industrial education program was asked if they were planning any program changes for the next year, 1980-1981. A total of 43 districts reported that they did not expect any changes in the programs offered or number of industrial education teachers employed. Eight of these 43 reported that their enrollment in industrial education was holding steady in spite of a general decline in total enrollment.

Five districts reported some decline in industrial education which would probably lead to some reduction in their industrial education faculty over the next 2 to 5 years. In all cases they expected regular attrition rather than a cut back to make the adjustment.

A total of 13 districts reported some type of change or situation other than "no change":

- One district reported that they planned to increase offerings by adding programs in two areas which would require two additional teachers.

- Two districts reported an increasing enrollment.
- One district, with three teachers, closed their program for lack of teachers (as previously noted).
- One district reported waiting lists for industrial education classes but could not expand due to financial situation.
- One district eliminated study hall duty for industrial education teachers so that they could teach extra sections of industrial education.
- One district is merging the agriculture and industrial education programs due to lack of teachers.
- One district will discontinue sending students to an AVC due to limited finance and one district will be joining an AVC.
- One district will add a WECEP program.
- One district is considering dropping industrial education since they have not been able to fill vacancy for two years.
- One district will add industrial education at the junior high level if teacher can be found.
- One district is entering a joint agreement with another district to increase offerings.
- Seven districts reported that they know that they would need staff replacements for current teachers at the end of the year.

Overall most districts do not expect any major changes. Enrollment in industrial education appears to be essentially stable. Where there are enrollment declines, normal attrition is expected to accommodate any staff reductions. Known needs for increases and replacement of current teachers exceeded anticipated reductions by about 4 to 1, in addition to current vacancies.

CHAPTER 5

# VOCATIONAL-INDUSTRIAL TEACHERS: SUPPLY AND DEMAND[a]

by Robert M. Tomlinson and Joseph Kolesar

This study of the national supply of and demand for vocational-industrial teachers was recently requested by INDUSTRIAL EDUCATION as a parallel study to that concerning industrial arts teachers conducted and reported by Dr. Rex Miller in this and earlier issues. It was undertaken as an extension of the Industrial Education Information System (IEIS) project at the University of Illinois supported by the Illinois Department of Adult, Vocational and Technical Education.

The term vocational-industrial education was used in the survey and is used in this report to include Trade and Industrial as well as Industrial Technology teachers and programs. Some states make a clear distinction between vocational, Trade and Industrial, and technical education, generally post-secondary, programs in the industrial area. The more inclusive definition was used to obtain comparable information from all states and to provide a more clearly defined population.

The decision was made to conduct the survey by telephone. Calls were not made to Alaska or Hawaii. Repeated calls were made to the five states where No Response (NR) is indicated in the table. In each of these five states we were unable to contact anyone who responded with the information requested. Since four of these five states (MI, NY, PA, TX) are among the largest in the nation, there is a sizable gap in the national picture presented in this report.

Determination of the actual number of vocational-industrial teachers involves a number of additional considerations beyond those necessary for a similar determination in industrial arts. The great majority of industrial arts teachers are full-time teachers with regular teaching credentials who teach, primarily, at the junior and senior high school level. Vocational-industrial teachers are employed in comprehensive high schools and vocational high schools and centers as well as a wide variety of special and area schools serving post-secondary or adult students. They may hold regular credentials or any one of several types of special, vocational teaching credentials or approvals. In addition, a large proportion of all vocational-industrial teachers are employed as teachers on a part-time basis only. In some states, such as Illinois, the same person may teach industrial arts classes for a part of a day and vocation-

al-industrial classes for another part, or hold a separate part-time appointment to teach a vocational-industrial class in the evening at the same or a different school.

The great majority of the state respondents could provide only very limited information concerning part-time teachers at either the secondary or post-secondary level. Of the 43 states that were able to provide data for the survey, a total of 29 states reported that the number of part-time teachers at the secondary level was either "unknown" (UK) or they were "unable to respond" (NA or NR) with any estimate of numbers. A similar situation existed for post-secondary vocational-industrial teachers. So few states were able to provide even an estimate of the number of part-time teachers that this information is not included in the table. A similar situation existed in attempting to gain an estimate of the supply/demand situation for part-time teachers.

Several studies have found that vocational-industrial teachers tend to be recruited to full-time teaching from a relatively nearby geographic region; approximately 50% were previously employed within 25 miles of their first full-time teaching position. Many had been part-time instructors at the same institution where they accepted their first full-time teaching position. It is not surprising that supply/demand information was "not available" for 21 states in the March 1980, Association for Schools, Colleges and University Staffing study. The ASCUS organization includes the teacher placement personnel at colleges and universities. The majority of vocational-industrial teachers start teaching without a college degree, and therefore do not register with these offices. The ASCUS report does show the vocational-industrial area with the greatest shortage of all teaching fields. Twenty-six of the 27 states where information was available reported a shortage of such teachers.

The ACIATE/NAITTE Industrial Teacher Education Directory, 1979-1980 was reviewed to obtain information concerning the supply of vocational-industrial teachers. Accurate interpretations of the numbers of vocational-industrial graduates reported in this Directory are not possible due to the various titles and classifications used by the various institutions. Shown in the Table are the numbers, as near as could be determined, of reported vocational-industrial BS graduates by state. The numbers may be an underestimate since graduates with a different BS degree title may have included vocational-industrial teachers. It is also quite likely that many of the 1,259 BS degree graduates from the 81 institutions had been employed as vocational-industrial teachers for some years, but just received their degree in 1979-80.

TABLE 5.1: SUPPLY AND DEMAND FOR VOCATIONAL-INDUSTRIAL TEACHERS

| | ASCUS-Supply/Demand[a] | Ind. Teacher Ed. Directory 1979-80 # BS Grads in T & I | # Insts. Prep. T&I BS Grads | Basis for Information Provided by State | Secondary Full-Time Inc/Dec[c] in No. of Teachers from 1979-80 to 1980-81 (Secondary) | | Secondary Full-Time Supply/Demand | Secondary Full-Time # F-T Teachers | Secondary Full-Time Total # FT + PT | Post-Secondary Full-Time Inc/Dec[c] in No. of Teachers from 1979-80 to 1980-81 (Post Secondary) | | Post-Secondary Full-Time Supply/Demand | Post-Secondary Full-Time # F-T Teachers | Post-Secondary Total # F-T + P-T | Total Sec & Post-Sec. Total F-T T & I Teachers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | | 7 | 8 | 9 | 10 | | 11 | 12 | 13 | 14 |
| | SS | 98 | 4 | 1 | | 35 | AB | 850 | 850 | I | 17 | SSu | 805 | 1505 | 1655 |
| | NA | 22 | 1 | 2-4 | NR | | SS | NB | NB | NR | | SS | NB | | 1558 |
| | NA | 0 | 0 | 2-4 | I | 50 | AB | 260 | 285 | NC | | SS | 290 | 290 | 550 |
| | SS | 39 | 4 | 4 | D | S | SS | 4700 | 6700 | I | S | SS | 1500 | 1500 | 6200 |
| | CS | 12 | 1 | 3-4 | NC | | AB | NB | NB | NC | | AB | NB | NB | 800 |
| | NA | 24 | 1 | 1-4 | I | 50 | SS | NB | NB | NB | | SS | NB | NB | 1135 |
| | NA | 0 | 0 | 1-4 | D | 7 | AB | 187 | 187 | NC | | AB | 10 | 10 | 197 |
| | SS | 95 | 5 | 1 | I | 100 | SSu | NB | NB | NR | | SSu | NR | NR | 3808 |
| | NA | 26 | 3 | 3 | I | 80 | AB | 1200 | 2000 | I | 25 | AB | 800 | 3000 | 2000 |
| | NA | 0 | 0 | 1 | I | 2 | SS | 68 | 71 | NC | | AB | 150 | 150 | 218 |
| | CS | 11 | 2 | 4 | NC | | CS | 2000 | 2000 | I | 50 | AB | 1000 | 1000 | 3000 |
| | CS | 10 | 1 | 3 | I | 25 | AB | 1000 | 1000 | NC | | AB | 20( | 1500 | 1200 |
| | NA | 0 | 0 | 1-5 | I | 16 | SS | 170 | 170 | I | 10 | SS | 438 | 438 | 608 |
| | CS | 9 | 1 | 1-4 | D | NA | AB | NB | NB | D | NA | AB | NB | NB | 504 |
| | NA | 81 | 7 | 1 | D | 64 | CS | 709 | 709 | UK | | UK | UK | 171 | 880 |
| | NA | 8 | 1 | 1-4 | I | 65 | AB | 261 | 261 | I | 140 | SS | 1100 | 1725 | 1361 |
| | CSu | 23 | 1 | 1 | I | 5 | AB | 176 | 178 | I | UK | AB | 273 | 322 | 449 |
| | CS | 5 | 1 | 1 | NC | | AB | 699 | 699 | NC | | AB | 189 | 189 | 888 |
| | SS | 0 | 0 | 4 | I | 186 | AB | 6200 | 6200 | I | 24 | AB | 800 | 800 | 7000 |
| | CS | 93 | 4 | NR | | | NR | | | | | NR | | | |
| | CS | 12 | 3 | 1-4 | NC | | AB | NB | 800 | I | 10 | SS | 675 | 2175 | 1475 |
| | SS | 52 | 3 | 4 | NC | | NR | 314 | 614 | NC | | NR | 360 | 660 | 674 |
| | SS | 2 | 1 | 1-4 | I | 140 | SS | 702 | 80? | NC | | SS | 300 | 385 | 1002 |
| | NA | 10 | 1 | 4 | I | 8 | SS | 40 | 100 | I | 2 | SS | 120 | 320 | 160 |
| | CS | 64 | 1 | 1 | I | 6 | SS | 147 | 147 | I | 4 | SS | 303 | 303 | 450 |
| | NA | 0 | 0 | 1-4 | I | 18 | SS | 190 | 190 | I | 5 | SS | 50 | 135 | 240 |
| | NA | 5 | 1 | 1 | I | 23 | SS | 127 | 127 | NA | | NA | NA | | 127 |
| | NA | 4 | 1 | 1-4 | D | 5 | SS | 1800 | 1800 | D | S | SS | 360 | 360 | 2160 |
| | SS | 0 | 0 | 4 | NC | | AB | 102 | 102 | I | 15 | AB | 185 | 185 | 287 |
| | NA | 68 | 4 | NR | | | NR | | | | | NR | | | |
| | NA | 24 | 2 | 1-4 | I | 170 | CS | 1700 | 1800 | I | 30 | CS | NB | 300 | 2000 |
| | NA | 0 | 0 | 1-2 | D | NR | AB | 97 | 97 | D | NR | AB | NB | 153 | 250 |
| | SS | 99 | 6 | 4 | I | NR | SS | 3800 | 3800 | I | NR | SS | NB | 4000 | 7800 |
| | NA | 18 | 1 | 5 | I | NR | NR | NB | 750 | NR | NR | NR | NR | NR | 750 |
| | SS | 4 | 1 | 4 | NC | | SS | 275 | 275 | NC | | SS | 125 | 175 | 400 |
| | CS | 112 | 3 | NR | | | NR | | | | | NR | | | |
| | NA | 25 | 1 | 1 | I | 5 | AB | 150 | 150 | I | 3 | AB | 40 | 40 | 190 |
| | NA | 14 | 1 | 1-4 | I | 11 | SS | 786 | 786 | NC | | SS | 2200 | 3400 | 2986 |
| | CS | 13 | 1 | 1 | I | 2 | SS | 80 | 80 | I | 5 | AB | 127 | 127 | 207 |
| | CS | 26 | 3 | 1-4 | I | 50 | SS | 1500 | 1555 | NC | | SS | 511 | 511 | 2011 |
| | CS | 86 | 2 | NR | | | NR | | | | | NR | | | |
| | CS | 4 | 1 | 4 | I | 55 | AB | 350 | 350 | I | 100 | AB | 700 | 900 | 1050 |
| | NA | 0 | 0 | 1-4 | I | 10 | AB | 170 | 170 | NA | | NA | 0 | 0 | 170 |
| | NA | 26 | 3 | 4 | I | 11 | SS | 1300 | 1300 | NA | | NA | NA | NA | 1300 |
| | CS | 5 | 1 | 4 | NR | | NR | 272 | 272 | NR | | NR | 44 | 44 | 316 |
| | CS | 4 | 1 | 4 | I | 50 | AB | 400 | 400 | I | 55 | AB | 100 | 100 | 500 |
| | CS | 19 | 1 | 4 | I | S | SS | 550 | 600 | NA | | NA | NA | NA | 550 |
| | CS | 7 | 1 | NR | | | NR | | | | | NR | | | |
| TOTAL | | 1259 | 81 | | | | | 33332 | 38382 | | | | 13755 | 26873 | 61066 |

[a] 1979-80 Data
[c] 1978-79 Data
I - Increase
D - Decrease

1 - Actual records or survey
2 - Some review of composite or other reports
3 - Informal reports
4 - Best guess or impression
5 - Other

CSu - Considerable Surplus
SSu - Some Surplus
AB - About Balanced
SS - Some Shortage
CS - Considerable Shortage

NA - Data Not Available
NB - No Breakdown for F-T/P-T or Sec./Post Sec.
NC - No Change
NR - No Response
S - Slight Increase or Decrease
UK - Unknown

A total of 36 states reported that "most" of their vocational-industrial teachers were employed directly from industry and then received their teacher education as inservice after employment. Four states obtain "most" of their secondary level teachers from teacher training institutions and one state obtains about one-half of its teachers from each source. Information was not available from the remaining states.

It is apparent that many of the people who enter teaching directly from industry later complete at least the BS degree. Across the 33 states that provided information in the survey, an average of 42% of the teachers held at least the BS degree; 15 states reported 25% or less with degrees while seven states reported over 75% of their teachers with a BS degee.

## Basis of Information

Each respondent was asked for the basis on which the response was made. A total of 10 respondents were able to reply from a current data base. Twenty-three of the 43 respondents used some combination of bases for the information requested. Thirteen states could provide only a "Best guess or impression." The states utilized various combinations of information for maintaining their records and, therefore, often could not provide separate information for secondary and post-secondary teachers or for full-time and part-time teachers. Respondents were encouraged to make estimates if they did not have available information. In general, the respondents more often had a better basis for secondary level information than for post-secondary. In summary, all data and other information that you will find in this report must be considered to be a compilation of the "best estimate or judgment" of the respondents.

## Number of Vocational-Industrial Teachers

The total number of vocational-industrial teachers reported by the 43 states was 61,066. This total for full-time and part-time teachers is a significant underestimate of the actual total. In addition to the missing data for all categories in seven states, a number of the reporting states did not have available data for one or more categories. The sub-totals for the various separate categories do not total to the 61,066 since some states could provide the information only by total and "no breakdown" by categories. The number of teachers reported ranged from 127 in New Hampshire to 7,800 in Ohio. Michigan, New York, Pennsylvania, and Texas did not respond but have extensive programs;

if these states have as many teachers as the states of similar population, then the total number of vocational-industrial teachers is likely well over 100,000.

## Supply and Demand

The vocational-industrial teacher is in demand in practically all states. The shortage is somewhat greater at the secondary than at the post-secondary level. In comparison with Dr. Miller's surveys, the shortage is somewhat less in vocational-industrial than in industrial arts. As shown in the table, 18 states reported that their supply and demand is "about balanced" at the secondary level, and 16 states reported the same for the post-secondary level. An equal number of states at each level, respectively, reported "some shortage." Florida was the only state to report "some surplus" at each level; Alabama reported some surplus in some areas at the post-secondary level.

Several states with shortages felt that they had a relatively critical situation. One state department representative stated, "If things do not change dramatically and soon, we will not be here within the next five years." Few of those reporting expected any change for the better in the coming years. Many of those who reported that they had an "about balance" situation also indicated that they could usually find "someone" after a search, but the person employed often did not have the qualifications they desired.

There was a geographic element to the supply/demand situation. Many of the Northeastern states reported shortages while the Sunbelt states had less of a shortage, often attributed to the fact that northern teachers were migrating. Some of these migrating teachers were early retirees.

Some states reported that a high proportion of their certified vocational-industrial teachers will be retiring within the next five years. Others reported an increasing turnover rate. Some Western states need teachers for emerging programs, e.g. in the energy field.

Comments from respondents helped to illustrate the nature of the shortages. Both New Jersey and North Dakota reported a 10% per year attrition rate for their teachers, while South Carolina reported a 15% rate. Virgina could not open 27 programs at the secondary level due to a shortage of teachers. At one point during 1979-80, North Carolina had 300 to 400 vacant positions. Maryland reported difficulty in finding teachers to work with special needs students, to meet the new federal regulations. Mississippi reported a shortage of female instructors in all areas and was seeking women with a trade background

and a master's degree for state supervisory positions. Montana reported that they were unable to get teachers, or potential teachers, to relocate in areas where jobs were available. Although most of the above were voluntary comments from representatives of single states, it is likely that similar situations existed in many other states.

## Fields of Shortage/Surplus

New Mexico and Georgia were the only states that reported no shortage in any field. Five states reported a "slight" surplus in auto-mechanics while four states reported some surplus of building trades instructors.

The electronics field was the most often reported as having a shortage--17 states. Competition with industry was consistently mentioned as the basis of the shortage in this field. There was a reported shortage of automechanics in 15 states, especially the Southwest and Western states. Metal machining trades (12 states), graphic arts and printing (eight states), and welding (eight states) were reported as shortage fields. Heating and air conditioning and related areas were mentioned as shortage fields in five states. Other shortage fields reported included: industrial co-op education, metal fabrication, electro-mechanical, electrical (several areas), auto body, sheet metal, plumbing, mine maintenance, and masonry. The trades related to the energy field generally are expected to increase and have shortages.

## Changes from 1979-80 to 1980-81

The state respondents were asked about changes in the supply/demand from 1979-80 to 1980-81. Twenty-eight of 41 states that reported information for the secondary level indicated that they had an increase in the number of teachers, six indicated a decrease and seven reported "no change." Of the 33 states that reported information for the post-secondary level, 19 reported an increase, three a decrease, and 11, no change. The reports of a decrease are misleading in some cases. For example, Kentucky reported a decrease of 64 teachers; this decrease was due to 64 vacant positions at the time of the survey. Each state representative was asked for the amount of the increase or decrease; their responses are shown in the table. In general, the changes were relatively small. Enrollments appear to be generally stable or increasing.

## Reasons for the Shortage

By far the most commonly cited reason for the shortage of vocational-industrial, as well as industrial arts, teachers was the salary for teaching as compared with the salary in industry. A difference of at least $5,000 per year in salary plus a significant difference in the fringe benefit package was most commonly reported. There were other reasons.

Alton D. Ice, Executive Director of the Advisory Council for Technical-Vocational Education in Texas provided a summary of a survey carried out for the Council. They conducted an in-state study and then a survey of the State Advisory Councils across the nation. Thirty-eight states responded. The survey focused on the Recruitment and Retention of Vocational Teachers, including Vocational-Industrial teachers. They found the greatest shortage of teachers in Texas to be in the vocational-industrial area where approximately 100 instructional units were dropped or failed to be implemented in 1979-80 due to a shortage of teachers.

The reasons for the shortage found in Texas were then included in a questionnaire sent to the other State Advisory Councils. The reasons found in a study by Paul W. Lindsey in Texas during 1979 and ranked by the other State Advisory Councils were essentially parallel to those reported by the respondents in this survey. They may be summarized, in rank order, as:

1. Inadequate pay/compensation--including salary and fringe benefits.
2. Teaching environment--including inadequate opportunity for advancement, poor student attitude toward school, and lack of administrative support.
3. Recruitment--including lack of viable and on-going recruitment program, lack of available inservice training for teachers, reluctance to give up seniority in trade unions.
4. Credentialing--including unrealistic standards, difficulty in scheduling and paying for required certification and maintenance courses.

Reason 1 stands by itself; reason 2 is an easy second, while reasons 3 and 4 are much lower in the rankings.

## Reducing the Shortage

The Texas survey to the other states found that a total of 16 states had made moves to reduce the pay/compensation reason by: paying (steps on the salary schedule) for work experience, improving the teacher benefits program

and extending the regular contract, and providing summer work. Based on this study, the Texas State Board of Education has approved 1) support for pay for two years of work experience that is required for certification and 2) extension of pre-employment lab teachers contracts from 10 to 11 months.

South Dakota schools have advertised in local newspapers with desirable results. Nebraska is having vocational-industrial teachers teach in fields other than their primary trade area. Virginia has started a program called Trade and Industrial Education Network (TIEN). One purpose of TIEN is to attract those leaving military service into teaching. Iowa also initiated a program to utilize military personnel as supplemental instructors.

## Program Developments

Indiana has initiated a program with cooperation among vocational education, the Lt. Governor's Office, and the Chamber of Commerce to bring new industry to the state. Louisiana will be hiring 75 new staff members starting in July, 1981, for the new $12 million regional vocational center in New Orleans. Massachusetts has a new $35 million Humphrey Occupational Resource Center which includes 110 occupations in 14 cluster areas. Colorado expects a large trade and population growth due to shale oil production. New programs in the energy field are being developed in North Dakota, Kansas, and New Mexico. The legislature in Ohio has mandated a new firefighting training program. Twenty-thousand persons attended training sessions in fiscal 1980. Nevada is anticipating a significant increase in training needs if the MX missile program is initiated. Teachers in Oregon must now take an eight-hour workshop on anti-discrimination practices and, in addition, hold a First-Aid card to receive certification.

## Summary

The current state of the art in record keeping and information systems at the state level makes it impossible to determine either the actual numbers of vocational-industrial teachers or the extent and nature of the supply/demand situation. It is clear that there are a great many states and local programs that find it difficult, if not impossible, to employ an adequate number of appropriately qualified teachers in the vocational-industrial area. This situation is typically referred to as a shortage.

Employment and retention of teachers is a labor force activity and must be dealt with by labor force terminology and rules. The situation that exists is this: there is an adequate number of qualified individuals in the total labor force, but they will not accept and continue in the teaching positions available for the compensation and conditions offered. In labor force terms this is not a true shortage since potential teachers exist. To correct the current situation, the benefits for teaching must be increased to equal or exceed those offered by competitive employment. It is encouraging to find that some states are at least moving in this direction. It remains to be seen whether or not these kinds of moves will be adequate to make possible quality vocational-industrial programs.

[a]This chapter was published as:

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# CHAPTER 6

## SUMMARY

The Industrial Education Information System Project (I.E.I.S.) was undertaken in cooperation with all of the seven state universities that prepare industrial education teachers, the Illinois Industrial Education Association, and the Department of Adult, Vocational and Technical Education of the Illinois State Board of Education. It was initiated in the Fall of 1978 to establish a data base to determine the number and types of industrial education programs in the State as well as background on the teachers in those programs. The ultimate objective of establishing this data base was to then be able to deliver improved in-service education and other services for the improvement of industrial education programs in the State of Illinois.

The types of activities undertaken by the IEIS Project during Phase I (1978-1979) were: 1) a survey of all BS degrees graduates in industrial education from the seven state universities in Illinois. All graduates who completed their degrees from July 1, 1973 through June 30, 1978 were sent a questionnaire by the respective individual institutions in the Spring of 1979. This study of all graduates was conducted to determine the potential supply of industrial education teachers produced in Illinois. The results of this study are reported in IEIS Report No. 2 (Tomlinson, 1980). 2) a Pilot study was conducted during Phase I to determine the number and type of industrial oriented programs and teachers in two geographic areas of the State and to develop and to pilot test procedures for the statewide study. The results of this Pilot study are reported in Chapter IV of this report and provide the data base for the follow-up study of teacher turnover.

During 1979-80 the procedures developed in the Pilot study were extended to all public school districts in the state of Illinois outside of the city of Chicago. Data were obtained for all attendance centers in the public schools which contained grades 7 and above. Directories for each region in the state were prepared and distributed. Later reports will contain analyses of this information.

Existing sources of data including the last published directory of all school districts in the state of Illinois and a listing of teachers from the Department of Adult, Vocational and Technical Education were utilized as a base

for conducting the Pilot study in the two geographic areas. A printout of all principals was obtained from the Illinois State Board of Education to provide a comprehensive coverage of all public schools in the two regions. The last published state directory of all approved schools in the state included a listing of all private schools in the areas. However, this directory was for the 1976-77 school year. All public and private schools were included in the Pilot study. Questionnaires and coding formats were developed and field tested at selected schools where cooperating members of the Illinois Industrial Education Association were located. After the Pilot study, the forms were revised for some classifications and to accommodate specialized situations. A similar procedure was utilized for the printed instructions that accompanied the forms.

Contact persons for each of the two Illinois Industrial Education Association Roundtables were identified. Each of these contact persons agreed to distribute the questionnaire forms to each of the local schools in their Roundtable. The completed forms were then returned to a contact person in each local school district and then to the Roundtable contact person and finally back to the IEIS office. One of the criteria utilized in selecting the two geographic regions was an active Roundtable which had contacts with the industrial education teachers in most of the school districts within their Roundtable. Some funds were available to the Roundtables to cover their expenses and to provide assistance in gathering the field data. This approach was relatively effective in most cases. On-site visits by the contact person were made in many of the cases. Where difficulties were encountered, direct phone calls were made from the IEIS project office to obtain all data or the remaining data where some information was incomplete.

## The Population and Samples

The population for this study was the industrial education teachers and their teaching positions in the public schools that were identified in the Pilot study of industrial education programs in the Rockford and Peoria regions, a total of nine counties, during the 1978-79 school year. The school districts, attendance centers, teaching positions and industrial education teachers were believed to be representative of the remainder of the state. The positions were in school districts that ranged from small and rural, the smallest having an Average Daily Attendance (ADA) of 130 students, through suburban and urban, and included two of only twelve school districts in the state that had

enrollments of 12,000 or more students, Rockford with an ADA of 30,569 students and Peoria with an ADA of 18,801 students (Illinois State Board of Education, (1979b).

The communities included rural, agriculturally oriented, suburban, and urban, heavy industrial centers dominated by such companies as Caterpillar, Borg-Warner, Chrysler, Rockford Machine and Tool, and Sundstrand.

The Rockford region included five counties with 40 school districts of which 30 (75%) had some type of industrial education program. There were 172 teachers and/or teaching positions in the region. The Peoria region included four counties with 61 school districts of which 30 (49%) had industrial education programs of some type. There were 152 teachers and/or teaching positions in this region during the 1978-79 school year. A more detailed description of the school districts, attendance centers and personnel is presented in Chapter 4.

## Industrial Education in Private/Parochial Schools

A total of 40 private/parochial schools were identified in the two regions which offered classes for grade 7 or above. Only four schools offered high school classes. Each was contacted to identify any industrial education programs. Only three of the private/parochial schools offered any type of industrial education. These schools employed five teachers who taught industrial education, most often drafting. Students from some of the private/parochial schools attended a public school on a part-time basis for industrial education classes.

The numbers of programs and teachers in the private/parochial schools were so small that they were not included in any analyses in this report nor in any later phases of the IEIS study.

## Teacher Turnover Sample

The sample for this part of the study consisted of those industrial education teaching positions that experienced a position change between January, 1979 and January, 1980. The sample included both the positions and the teachers involved in those positions where a position change occurred.

The Pilot study identified 24 of the 60 districts or 40%, with industrial education programs that had one or more vacancies. A total of 40 FTE vacancies (44 teachers) were reported by the 24 districts for the beginning of the 1978-79

school year. At the time of that survey, eight of the 60 districts (13.3%) had not been able to find teachers to fill 11 FTE vacancies.

The information from the 1978-79 Pilot study provided baseline data for the teacher turnover study carried out in May and June of 1980.

A telephone interview was conducted to each of the 61 of the total 101 public school districts that had been found to offer at least one industrial education class. This provided information concerning any "position change" or program change in industrial education from January, 1979 to January, 1980. The respondent at the district also provided information to help find and interview the teachers who had left an industrial education teaching position. It was possible to contact and interview 34 of the 48 teachers who had changed positions. One teacher had deceased.

## Industrial Education Teacher Supply in Illinois

Schools in Illinois have reported increasing difficulties in finding industrial education teachers to fill positions available. No systematic procedures are available in Illinois for determining the number of teachers or vacancies or related information. The Research Section of the Illinois State Board of Education (I.S.B.E.) reports each year the number graduated and certifiable to teach by field. These data have been found to be in error when compared to the data prepared by the persons actually responsible for preparing industrial education teachers. The categories used by ISBE are so general for industrial education that the data have limited utility.

The Teachers Service Record (T.S.R.) which is the standard data reporting form from the local schools to ISBE has similar, substantial limitations. Only five categories of teaching specialties are provided on the TSR for industrial education; almost one-half of all such teachers are classified as "other" for teaching specialty. No code is provided for coordinators of part-time cooperative teachers in the industrial area.

As a part of Phase I of the I.E.I.S., the seven state universities that prepare industrial education teachers cooperated in a follow-up study of all B.S. degree graduates who had completed their degree from July 1, 1973 through June, 1978. Additional data has been obtained for graduates from June, 1978 through June, 1980. Detailed results of this study have been reported previously by the I.E.I.S.

There was a total of 1138 B.S. graduates in the study. All graduates were sent questionnaires in the spring of 1979. A total of 607 graduates returned questionnaires. There was some information available on an additional 325 graduates, from student records, etc.

The number of industrial education graduates per year from the seven universities has declined from 255 graduates in 1972-73 to 161 in 1979-80 or a 36.9% decrease.

Five of the seven industrial education departments also offer a non-teaching B.S. degree in Industrial Technology. The number of graduates from these programs has increased from 226 in 1973-74 (the first year where complete data are available) to 361 in 1979-80. This is an increase of 60%. Current enrollment in the two types of programs and other information indicate that the trends for the two types of programs will continue. Although objective data are not available, the department chairs estimate that the average beginning salaries of the technology graduates exceed those of the teacher education graduates going into teaching by at least $5000 per year.

The trends in enrollment for industrial education vs industrial technology as well as the salary differential are reported in a similar manner to those in Illinois by most institutions across the country.

It is known that all graduates do not enter teaching as their first employment after graduation. The percentage of graduates who enter education as first employment ranged from 44.2% at the U of I to 84.6% at CSU. Across all graduates, 55.9% accepted first employment in education.

The follow-up also confirmed the trend of those in teaching leaving the profession for jobs in industry, government or self-employment. About 73% of all graduates of industrial teacher education programs have held teaching jobs. Approximately 65% of all graduates enter teaching the first year after graduation. By the second year only 53.5% of the graduates were in education. By the fifth year the percentage employed in education had fallen to 43.2% of all graduates.

As might be expected, business and industry had attracted the bulk of the persons not employed in education. Beginning with 19% of the new graduates this group jumped to 34.7% by the second year, and slowly climbed to 37.6% by the fifth year after graduation. Self-employment and employment by government also showed a steady rise in the percentages of employment.

There were 389 cases where both first employment (including graduates from 1973 through 1978) and employment in 1979 were known. A total of 216, 55.5%,

had taken first employment in education. In 1979, only 175 or 45.5% of the total were employed in education or a decrease of 25.9% in education. A total of 56 graduates had left education for other employment while a total of 15 had moved from other employment to education. This is a ratio of almost four to one for certified teachers who leave education to those who return to education, for those teachers who have had their B.S. degree from one to six years.

The university B.S. follow-up also attempted to determine the graduates' plans for remaining in education or returning to education in the future. When those in teaching were asked if they planned to remain in teaching, 30.9% said no and 11.6% were undecided. When asked why they did not want to remain in teaching, 82.3% responded "Higher pay and benefits in other jobs." About 56% of those that gave a first response to the question also gave a second reason for not wanting to remain in education. The most common second reason was "Too many problems with students, administration, etc."

The group of graduates that were not in education were asked their intentions to return to or seek employment in education in the future. Of this group, 85.3% gave the same reasons for not reentering or entering education: "higher pay, benefits in other employment."

## Summary

The supply of industrial education teachers provided by the seven state universities in Illinois has declined 36.9% in the most recent eight years. The trend of fewer new potential teachers is expected to continue under current circumstances.

The teacher supply situation is being further reduced by the trend of fewer new graduates who take employment in education and those who do are leaving teaching for other employment after fewer years of employment in education.

Greater pay, benefits and opportunities in employment outside education are the reason cited by the great majority for not accepting employment in education. The school situation (problems with students, administration and budgets) is cited as the second reason for not teaching.

Increasing enrollments in industrial teacher education preparation programs, if it could be accomplished, would not remove the shortage so long as the graduates find other employment to be more desirable.

## Industrial Education Programs and Personnel

This summary of programs and personnel is based on analyses of data collected during the 1978-79 school year in the Peoria and Rockford regions. All 101 public school districts in the nine counties were included in the data collection.

### Industrial Education Programs

There were 37 K-8 districts, 11 9-12 districts and 53 K-12 districts in the two regions.

TABLE 6.1: DISTRICTS AND ATTENDANCE CENTERS WITH AND WITHOUT INDUSTRIAL EDUCATION PROGRAMS

| | Districts | | | | Attendance Centers[a] | | | |
|---|---|---|---|---|---|---|---|---|
| Type of Dist | Tot | W/Pgm | W/O Pgm | %W/Pgm | Tot | W/Pgm | W/O Pgm | %W/Pgm |
| K-8 | 37 | 3 | 34 | 8.1 | 38 | 4 | 34 | 10.5 |
| 9-12 | 11 | 11 | 0 | 100.0 | 14 | 14 | 0 | 100.0 |
| K-12 | 53 | 47 | 6 | 88.7 | 165 | 88 | 77 | 53.3 |
| | 101 | 61 | 40 | 60.4 | 217 | 106 | 111 | 48.8 |

[a]The 217 Attendance Centers include five Area Vocational Centers.

### Industrial Education Programs by District and Attendance Centers

Industrial education programs by district and attendance centers may be summarized as follows:

Only [illegible]% of all school districts offer any industrial education program. All high school districts offer a program. However, only 8.1% of the K-8 districts offer a program. Of the 53 K-12 districts, 47 or 88.7% offer a program in at least one attendance center.

In total less than 50% of all attendance centers for students in grade seven or above offer any industrial education. The K-8 district attendance centers are least likely to offer a program in their attendance centers, only 10.5%. All 14 high schools in 9-12 districts offer some industrial education. Approximately one-half, 53.3%, of the attendance centers in 9-12 districts offer a program.

In total, 72 of the 78 high schools while only 30 of the 134, 22.4%, junior high/middle schools offer industrial education.

Teachers per Attendance Center

A total of 324 industrial education teachers were employed in the 106 attendance centers with programs. Some of the 324 did not teach industrial education as a full-time assignment; several were also the teacher of agriculture or other subjects or were administrators.

There was an average of 1.6 teachers per attendance center at the junior high level and 3.4 teachers at the high school level. Thirty-nine of the 106 attendance centers, 37%, had a single industrial education teacher and 31 had two teachers. Only 20 attendance centers had five or more teachers. Almost one-third, 30.2%, of all industrial education teachers teach at one or two teacher locations. The two largest high school programs had ten teachers each.

Teaching Assignments

The majority of the teachers, 57.6%, taught industrial arts only while 23.5% taught one or more courses that were industrial arts and other course(s) that were vocational industrial. The remaining 18.9% taught only vocational industrial courses.

Eighty-two percent of the teachers spent 75% or more of their time teaching industrial education courses. Thirteen teachers spent the majority of their time teaching other subjects, including vocational agricultural; three each spent the majority of their time as administrators, counselors and "other."

A total of 21 industrial education teachers had any released time for administration; seven of these had less than 10% and seven others had 11 to 24% released time.

Courses Offered

Each teacher reported each course title taught, the number of sections of each course, the grade level of the enrolled students and whether the course was industrial arts or vocational industrial. All courses were classified by the I.E.I.S. course code. The 324 teachers taught 96 different I.E.I.S. course titles with these course titles reported a total of 774 times. The total number

of sections for the 96 courses was 1474. On average a teacher taught 2.4 courses and 4.5 sections, or groups of students.

The definition of course section used in this study was a "group of students taught." A section ranged from a junior high group that met for one period, three days per week for six weeks to a vocational group that met for 15 hours per week for a year. No better index than section could be determined. The high number of sections taught at the junior high level influences all reports of sections.

The majority of all courses and sections taught at all levels were concentrated in the traditional areas of drafting and related, woodworking and related, metalworking and related and general shop. A variety of titles were used in each area. General shop was defined as an activity that included at least three materials areas. A wide variety of titles were used for similar courses across the local schools, especially at grades 7 through 9. See Table 6.2.

There were less than ten reported courses based on the industrial arts curriculum projects of recent years such as, Industrial Arts Curriculum Project (IACP), American Industries.

Almost two-thirds of all junior high/middle school course sections were general shop, woodworking or drafting.

Of the high school industrial arts offerings, six areas accounted for at least 78.2% of all offerings; they were, in order: woodworking, drafting, general shop, general metals, auto/power/diesel, and electricity.

The greatest variety of offerings were in vocational-industrial education at grades 11 and 12 and at the AVCs. Construction and building trades is the only area that comprises at least 10% of the section offerings. This area plus, in order, auto/power/diesel, metalworking, welding, industrial co-op, and drafting comprise less than one-third of all offerings.

Over one-third, 37.6%, of all course sections taught at the high school level, grades 9-12 plus AVCs, are vocational.

## Laboratories

A total of 327 laboratories were reported for the 105 attendance centers with programs. There were 50 at the junior high level for the 47 teachers at 30 attendance centers with programs. Thirty-one of these were general shop or combination (two areas) labs; 10 were drafting labs; and, nine were of all other types.

TABLE 6.2: MOST FREQUENTLY TAUGHT COURSES AND SECTIONS BY LEVEL AND TYPE

| Level | Courses | | | Sections | | |
|---|---|---|---|---|---|---|
| | | % | Cum % | N | % | Cum % |
| Jr. Hi/Mid. (7-9) | | | | | | |
| General Shop | 36 | 38.3 | 38.3 | 120 | 45.4 | 45.4 |
| Woodworking | 12 | 12.8 | 51.1 | 32 | 12.1 | 57.5 |
| Drafting | 11 | 11.7 | 62.8 | 21 | 8.0 | 65.5 |
| All Others | 35 | 37.2 | 100.0 | 91 | 34.5 | 100.0 |
| Total | 94 | 100.0 | 100.0 | 264 | 100.0 | 100.0 |
| H.S. Ind. Arts (9-12) | | | | | | |
| Woodworking I, II | 69 | 18.3 | 18.3 | 129 | 17.5 | 17.5 |
| Drafting I, II | 68 | 18.0 | 36.3 | 126 | 17.0 | 34.5 |
| General Shop | 58 | 15.4 | 51.7 | 123 | 16.6 | 51.1 |
| General Metals | 47 | 12.5 | 64.2 | 88 | 11.9 | 68.0 |
| Auto/Power Mech | 29 | 7.7 | 71.9 | 76 | 10.3 | 73.3 |
| Electricity | 19 | 5.0 | 76.9 | 36 | 4.9 | 78.2 |
| All Others | 87 | 23.1 | 100.0 | 161 | 21.8 | 100.0 |
| Total | 377 | 100.0 | 100.0 | 739 | 100.0 | 100.0 |
| H.S. Voc-Ind (11-12 and AVC) | | | | | | |
| Const/Bldg Trades | 22 | 7.9 | 7.9 | 46 | 10.3 | 10.3 |
| Auto/Power/Diesel | 16 | 5.8 | 13.7 | 35 | 7.9 | 18.2 |
| Metal Working | 18 | 6.5 | 20.2 | 28 | 6.3 | 24.5 |
| Welding | 10 | 3.6 | 23.8 | 23 | 5.2 | 29.7 |
| Ind Co-op | 13 | 4.7 | 28.5 | 21 | 4.7 | 34.4 |
| Drafting | 11 | 4.0 | 32.5 | 19 | 4.3 | 38.7 |
| All Others | 188 | 67.5 | 100.0 | 273 | 61.3 | 100.0 |
| Total | 278 | 100.0 | 100.0 | 445 | 100.0 | 100.0 |

At the high school and AVC level, there were 253 labs. Drafting and related (55 labs), woodworking and related (46 labs), metalworking and related (48 labs), and auto/power and related (40 labs) plus general shops (21 labs) comprised over 75% of all labs at this level. The 253 labs is an average ratio of 3.5 labs per attendance center and less than 1.2 teachers per laboratory. Since some teachers taught industrial education less than full-time there was approximately one teacher per laboratory on average.

The labs ranged from less than 13 to 60 in student capacity. However, labs with a capacity of 18 to 22, 32.3%, and those with a capacity of 23-27, 40.3%, were the most common. Most of the larger labs were designed and used as multi-teacher settings.

## Industrial Education Teacher Turnover

During the Pilot Study conducted during the 1978-79 school year, it was determined that a total of 44 vacancies had occurred from 1977-78 to 1978-79. Since the number of teachers can be assumed to be approximately the same as the 324 in 1978-79, this was a vacancy rate of 13.6%. Replacement teachers had not been obtained for 11 of the 44 vacancies, 25%, late in the school year. Twenty-four of the 61 districts, 40%, reported one or more vacancies during 1978-79.

A more detailed follow-up study of teacher turnover during 1979-80 was made in May and June of 1980 to all schools with programs. The results of this study with comparisons between those teachers who changed positions and the total population of teachers is summarized in this section.

During 1979-80, a total of 48 FTE persons of the 324 persons in industrial education positions made changes for a 14.8% annual change. These changes involved 26 of the 61 districts, 43%, with a program. Three of the 48 were position changes, reassignment, within the same district. One district with 3 FTE teachers closed their program after all three teachers resigned; this school had had complete turnover for three years. One teacher passed away during the year and one took early retirement. In total, 44 of the 45 teachers who made position changes that involved finding replacements did so voluntarily for employment in another location, in or outside of education.

Of the 48 vacancies a total of 8, 16.7%, were filled by teachers who changed positions; the remaining, 83.3% had to be recruited from new graduates, teachers from non-teaching employment or craftsmen without preparation for teaching.

## Turnover in Industrial Arts and Vocational-Industrial Education

The teacher turnover rate is much higher for teachers who taught at least one vocational-industrial class than for industrial arts teachers: 42.4% of all teachers taught at least one vocational class and 62% of all vacancies were for such teachers.

Eleven of the 48, 22.9%, vacancies were for the 47 AVC teachers. Eighteen of the 31 vacancies, 58.1%, at the high school level were for teachers who taught at least one vocational course.

Twenty-two of the 29 vacancies for vocational teaching positions were filled. Approximately one-half of these positions were filled by provisionally certified teachers, most of whom were hired from the surrounding area. There was a total of 76 teachers who taught one or more vocational sections of whom 29, 38.2%, changed positions.

There was a total of 248 teachers who taught only industrial arts; 47 at the junior high and 201 at the high school level; there were 5, 10.6%, and 31, 15.4%, vacancies at these two levels, respectively.

Four of the five junior high and seven of the ten high school industrial arts vacancies were filled while 14 of the 18 high school and eight of the eleven AVC vocational teacher vacancies were filled.

## Teachers' Age, Experience and Turnover

The youngest industrial education teacher was 23. There were: 21% of the teachers from 23 through 29; 34% from 30 through 39; 22% from 40 through 49; 20% from 50 through 59; and, 4% who were 60 years of age or older. The vocational teachers were, on average, somewhat older than the industrial arts teachers.

The youngest teachers were more likely to change positions and to leave teaching when they made a change; 29.4% of those who changed positions were 26 or less years of age and 58.8% were 30 or younger while only 22% of all teachers were in this age group. There are not enough teachers in the younger ages to replace the older age groups even if all remained in teaching.

Industrial education teachers tend to retire early or leave teaching before retirement age. Only 3.7% of all teachers in this study were 60 years old or

over; two of the ten in this group had "come out of retirement" to "help out" for one year.

There are 34 of the teachers in the 55 to 59 age group who could elect an early retirement while there are only 37 in the first or second year of teaching.

Of even greater concern is the finding that 40.5% of all first and second year teachers changed positions and approximately two-thirds of them left teaching for other employment.

Over one-half, 52%, of all teachers who changed positions had two years or less in the district they left while 17.5% of all teachers were in the first two years of employment in their current district.

Forty-one percent of all teachers have a total of six years or less of industrial education teaching experience; 70.7% of all persons who changed positions had six years or less of industrial education teaching.

Administrator/employers indicated that approximately 25% of those who changed positions would not have been rehired if they had a choice.

It is clear that the most critical time for loss of teachers is in the early years of teaching, especially during the first two years.

## Teaching Specialty, Location and Turnover

Automechanics and closely related courses were the specialty with the greatest number, 10 of the 48, and percentage of vacancies for both 1978-79 and 1979-80 and for both industrial arts and vocational industrial. This specialization also had the greatest number of unfilled vacancies.

General shop positions at the junior high (3) and high school (3) were the second most likely to be vacated. Metalworking, four in industrial arts and five in vocational, had the next greatest frequency of vacancies. These same specialties were likely to have unfilled vacancies for a long term.

Other vacancies occurred in: drafting (4), electricity (2), graphic arts (4), construction (4), woodworking (6) and Coop Ed (1).

AVC's had the highest rate of teacher turnover. Districts with combination junior high/senior high attendance centers had the next highest rate of turnover and to have more difficulty in filling those vacancies.

There was a relationship between low expenditure per pupil and teacher turnover. A similar relationship exists with the salary schedule since the

eleven teachers who moved from one district to another increased their salary by an average of $3500 per year.

Small school districts, in terms of Average Daily Attendance, had proportionately more teacher turnover than other districts. Rural districts had over twice as high a turnover ratio as any other type of district.

## Sources of Replacement Teachers

Of the total of 48 vacancies, replacements were sought for 44 positions. One program of three teachers was closed due to continued turnover and lack of teachers. In addition, three position changes were made within the same district.

In total, during the year, the vacancies were filled as follows:

| | | |
|---|---|---|
| - | 11 positions remained vacant for the year (a similar situation existed for the previous year) . . . . | 25.0% |
| - | 10 vacancies were filled by new graduates from universities in Illinois . . . . . | 22.7% |
| - | 10 vacancies were filled with provisionally certified teachers . . . . . | 22.7% |
| - | 5 vacancies were filled by teachers from other districts . . | 11.4% |
| - | 6 vacancies were filled by certified teachers who had been employed outside education . . . . . | 13.6% |
| - | 2 vacancies were filled on a temporary basis by previously retired teachers . . . . . | 4.6% |
| | 44 | 100.0% |

Twenty-seven of the positions had been listed with several university placement offices in up to ten states. Thirteen teachers were found through this source. Placement offices were the most productive sources for industrial arts teachers. Locally initiated searches and recruitment were the most productive for vocational teachers.

Searches continued for 29.6% of all vacancies for at least one year. In addition, since over 40% of all first and second year teachers and AVC teachers change positions each year, it can be expected that approximately another 25% of these positions will be vacant again within one year.

In summary, once a vacancy occurs there is a 1 out of 4 chance that it will not be filled within a year; 1 of 3 vacancies filled will be by a temporary or provisionally certified person. Or, in other terms, of all vacancies approximately one-half were still vacant one year later or filled with a temporary teacher or a teacher with less than full certification.

## Employment of Teachers Who Left Teaching

One teacher had deceased. It was possible to contact and interview 34 of the other 47 teachers who had changed positions. The results were:

- 14 - had taken positions in business/industry. One of these had taken an early retirement from teaching. Their average increase in total annual salary was $8000 over their total annual salary in education.
- 4 - had entered self-employment; two in a partnership.
- 1 - had become a full-time minister.
- 1 - was in the process of changing positions to employment out of education.
- 14 - were still employed in education.
  - 11 - were teaching industrial education: three in the same district; three in a different location for personal preference; and five for better salary and conditions. These eleven persons increased their annual salary an average of $3500 per year.
  - 2 - had taken administrative positions with an average increase in annual salary of $5500.
  - 1 - had returned to graduate school in industrial education.

Six teachers had been recruited from business/industry to education but 18 had been lost to business/industry employment for a loss ratio of 3 to 1. The great majority of those who changed positions initiated the search for a different position.

## Plans to Stay in Teaching and Reasons for Leaving Teaching

All teachers in the regions had been asked if they intended to remain in teaching for the next five years; 290 teachers provided responses. New teachers completing B.S. degrees had been asked the same question. Approximately 60% of each group indicated that they planned to stay in teaching. However, approximately 10% of all teachers in the field and 30% of the new teachers reported they did not plan to stay in teaching for the next five years. Approximately 30% of the teachers in the field and 10% of the new teachers were undecided about whether or not they would remain in teaching for another five years.

These responses indicate a continued high loss of teachers, especially among the younger teachers.

The primary reason given most often for changing positions was salary and benefits in their prior teaching position. This reason was cited by 71.4% of all respondents and was the primary reason by one-half of this group.

Other reasons frequently cited were, in order: problems with administration, especially in handling discipline problems; problems with students, especially for discipline, low ability and low motivation; lack of support and recognition by administration, other teachers and the community. Extra duties required in operation and maintenance of the facilities and limited budget were cited by several. Lack of future opportunity was also cited.

The teachers cited working with students, working with other faculty, freedom to plan and deliver an instructional program, summers off, and use of equipment in the labs as factors from which they had received satisfaction and would miss after leaving teaching.

## Planned Program Changes in the Future

Each of the 61 districts which had industrial education programs were surveyed to determine planned or anticipated changes in future years. A total of 43 of these districts reported that they did not expect any changes in their program or number of industrial education teachers.

In essentially all of the cases where a position remained vacant, the classes were being taught by the remaining teachers on an overload or other basis or were temporarily discontinued until a teacher could be found.

Eight districts reported that industrial education enrollment was holding at the same level despite overall enrollment declines. Five districts reported declines in industrial education enrollment but expected normal attrition of industrial education teachers to absorb any staff reduction.

Two districts had had increased enrollment and three planned to start new programs.

One district reported waiting lists for enrollment in industrial education classes but could not expand due to financial conditions. Another district had reassigned industrial education teachers from study hall and other assignments so they could teach additional industrial education sections. Another district had merged industrial education and vocational agriculture shops due to a shortage in both fields.

One district will be joining an AVC and another forming a joint agreement while a third will be dropping from an AVC due to limited finances.

One district is considering dropping industrial arts since they have been without a teacher for two years. Seven districts already knew that they would need one or more teacher replacements after the coming year.

Overall, no major changes were expected. A continuing teacher shortage was identified. Enrollment was relatively steady with regular attrition expected to match any declines. Known unmet needs exceeded anticipated reductions by about 4 to 1 in addition to current vacancies.

## Conclusions

Essentially all high schools offer at least some type of industrial education program. Less than one-half of all junior high school attendance centers offer any industrial education programs and less than ten percent of those in K-8 districts offer any industrial education programs.

Very few private/parochial schools offer any industrial educatjion (3 of 40 schools) although students from some of these schools attend public schools for industrial education.

Approximately two-thirds of all programs and one-third of all industrial education teachers are at locations with a one or two teacher industrial education staff.

One-fourth of all teachers teach both industrial arts and vocational-industrial education; somewhat over one-half teach industrial arts only and the remainder teach vocational-industrial classes only.

On average, each teacher teaches about two and one-half courses and four and one-half classes or sections.

The great majority of all course sections taught at all levels are in the traditional areas of: general shop (especially at the junior high level), drafting, woodworking, metalworking and auto/power mechanics. Only isolated examples of cluster type of industrial arts courses are being offered. Courses with similar content have a wide variety of titles; the reverse is also true.

The number of graduates prepared per year as certified industrial education teachers by the seven state universities in Illinois has declined substantially over the most recent years and this decline is continuing.

In recent years a lower percentage of new graduates are accepting employment in education and those who do are leaving after less years in teaching compared to graduates of earlier years.

Space is available in all industrial teacher education programs and the reduced enrollment is making it difficult to maintain these programs in some institutions. Junior college and within institution transfers comprise approximately two-thirds of all industrial teacher education graduates.

Approximately four industrial education teachers leave education for employment outside education for each one that changes from outside employment to education.

The supply of new, certified teachers does not meet replacement needs at current production and attrition levels; trends indicate that the situation is becoming worse. Substantial increases in enrollment in industrial teacher education programs cannot meet the needs unless the increasing loss of industrial education teachers to other employment can be reduced significantly.

The primary reason for industrial education teachers leaving teaching is the substantially higher pay and benefits of other competitive employment. Problems in the schools with discipline, lack of support and extra duties due to the nature of the instructional facilities are contributing factors.

Industrial education teacher turnover is approximately 15% per year with the greatest turnover by first and second year teachers, vocational-industrial teachers, and industrial arts teachers in rural districts with low salary schedules and expenditures per pupil.

Once a position becomes vacant there is a 1 in 4 chance that it will be vacant for a year; and, if filled, there is a one in three chance that the replacement is on a temporary basis and/or provisionally certified. Many temporary and "make-do" arrangements are being used to avoid reducing programs still further for lack of regular teachers.

Due to the high proportion of vacant positions filled with temporary replacements and teachers in their first two years of teaching, who have a high turnover rate, a school that has a vacancy is likely to have two or more changes before a "permanent" replacement will be found.

Approximately one-half of those industrial education teachers who leave teaching would consider returning only if the salary and benefits were equal to those in business/industry. One-third would not consider returning to teaching under any circumstances.

## Recommendations

1. Greater assistance should be provided in industrial education teacher education programs to prepare the graduate for effectively handling problems with students, including, discipline, low motivation and low abilities.

   Some teacher education programs have made changes to implement earlier and more extensive involvement in the actual local school settings. Additional experiences of this type

would be difficult since a high proportion of all industrial education majors enter the program as transfers in the junior year. Additional approaches should be explored.

2. A mechanism should be established to identify all first and second year teachers on a statewide basis and to provide for continuing inservice education to these teachers in the early years of their teaching experience.

   The greatest loss of teachers occurs during this period of time and it is essentially impossible to provide adequate preparation prior to entering first employment in teaching. Adding additional time to the existing preservice requirements would further reduce an inadequate supply of teachers in this field.

   The inservice delivery mechanism for first and second year teachers should be a coordinated effort by the teacher education institutions, the local schools and the Illinois State Board of Education. It will take a coordinated effort since no one group has the resources or personnel to meet the need.

   Local schools should initiate actions to provide a senior staff member as a mentor/consultant to new teachers.

3. Additional efforts should be made to recruit additional persons into industrial teacher education programs.

   Some efforts are underway. However, additional efforts to recruit from within the universities and the community colleges appear to have the greatest potential.

   Currently certified teachers in areas of surplus supply (e.g., social studies) should be recruited for retraining for teaching industrial education.

   Particular efforts should be made to recruit more females as teachers of industrial education. All teacher education programs have shown an increase in the number of female graduates in recent years but the number remains quite small.

4. Increased resources must be provided to the industrial education programs to improve the quality and breadth of offerings.

   Many reports of limited programs due to limited budgets for supplies, maintenance and replacement of equipment have been received. Industrial education teachers are required to expend additional time and efforts to attempt to overcome these limitations in addition to regular instructional activities.

   The great majority of all subjects offered are in the traditional materials areas where equipment is available. New areas or approaches have been adopted by very few schools.

5. Ways must be found to increase the income and benefits of industrial education teachers so that they are more equivalent to those in alternative employment in business/industry.

   A differential salary schedule arrangement which would reflect the market place realities of supply and demand would probably be the most desirable. However, since this is not possible in many locations other alternate mechanisms should be used.

   Employers should provide industrial education teachers with extended year and/or supplemental contracts to provide the necessary equipment and facility maintenance and upgrading necessary in all quality industrial education programs. Additional employment could be provided for general maintenance in the schools during at least a part of the summer.

6. A statewide clearinghouse for vacancies and potential teachers should be established. This clearinghouse would not serve as a placement office but rather as an information exchange resource.

   Schools with vacancies are initiating extensive searches with college placement offices in multiple states. Many teachers, especially vocational teachers and those prepared outside Illinois, do not have credentials on file where the employer may contact them.

   There are some evidences of reduction in teaching faculties and teachers are looking for other positions. There may be no way for these people to know of upcoming or actual openings. If they accept employment outside education, they are unlikely to return to education; they must be able to make contact with other positions early in the change process.

7. Research of the type initiated in this study should be continued to develop a more complete data base and to provide for more in-depth study of the factors related to teacher supply and turnover. This initial effort has identified many of the general relationships but additional development and information are needed.

   The data base being established in the IEIS study could serve as a valuable resource for further studies and for the recommended (above) inservice and retraining activities.

List of References

Association for School, College and University Staffing (ASCUS). Teacher supply and demand in the United States; 1980. Madison, WI 1980.

Benson, M. J. Teacher education programs and curriculum designed to prepare graduates with greater diversity so that graduates might qualify for a greater number of teaching positions in industrial education. Paper presented at 66th Mississippi Valley Industrial Education Conference, Chicago, November, 1979.

Blauner, R. Work, satisfaction and industrial trends. In Amitai Etzioni (ed.), A Sociological Reader on Complex Organizations. New York: Holt-Rinehart and Winston, 1969.

Cabot, S. R. Why they quite: An analysis of job satisfaction among industrial education teachers. Unpublished master's thesis, Menomonie: University of Wisconsin-Stout, 1979.

Carroll, S. J. The market for teachers. In Analysis of the Educational Personnel System, No. VIII. Santa Monica, Calif.: Rand, 1974, p. 25.

Cecere, Joseph J. Factors influencing Texas industrial-technical college or university students when selecting their major area of study. Unpublished doctoral dissertation, Denton: North Texas State University, 1980.

Charters, W. W. Some obvious facts about the teaching careers. Educational Administration Quarterly. Spring 1967, p. 193.

Cunico, G. E. & Fields, F. R. Industrial arts teacher satisfaction/dissatisfaction survey. Albuquerque: The University of New Mexico, Industrial Education, 1977.

Dennis, Ervin A. Industrial Teacher Education Directory 18th Edition, 1979-80. Sponsored by: American Council on Industrial Arts Teacher Education and the National Association of Industrial and Technical Teacher Educators. 1979.

Dunathan, A. T. Midwest schools face shortages of good teachers. Phi Delta Kappan, October, 1979, pp. 121-123.

Dyrenfurth, Michael J. Vocational data reports: the status of industrial arts. Man Society and Technology, 40:2, 1980, pp. 16-19.

Edmunds, N. An analysis of the reasons for industrial education teachers leaving the profession. Lincoln: The University of Nebraska-Lincoln, Center for Business and Vocational Teacher Education, 1980.

Edmunds, Niel A. Industrial Arts teacher supply and demand in Nebraska, 1979. The Nebraska Department of Education, Vocational Division, Lincoln, Nebraska. 1979.

Education Section. Time. Sept. 23, 1966.

Elam, Stanley M. In the long run, you get what you pay for. Phi Delta Kappan. November, 1979.

Field, Frank R and Cunico, Gerald E. Industrial Arts teacher satisfaction/ dissatisfaction survey. Albuquerque; University of New Mexico, Industrial Education, 1977.

Herman, R. W. Now inevitable: a substantial and lengthy teacher shortage. Phi Delta Kappan, June 1978, p. 693.

Herzberg, F., et al. The Motivation to Work. New York: John Wiley and Sons, Inc., 1959.

Herzberg, F. Work and the Nature of Man. Cleveland: The World Publishing Co., 1966.

High School Industrial Arts teachers' problems. Ind. Arts and Voc. Ed. 55:7 (September, 1967).

Holdaway. Edward W. Satisfaction of teachers in Alberta with their work and working conditions. Educational Resources Information Center, E. R. I. C. Document ED 151-948.

Ice, A. D. Recruitment and retention of vocational teachers in Texas. Austin: The Advisory Council for Technical-Vocational Education in Texas, 1980.

Ice, A. D. Summary of SACVE responses to questions on recruitment and retention of Vocational Instructional personnel Austin: The Advisory Council for Technical-Vocational Education in xas, (P. O. Box 1886, Austin, Texas 78767, mimeo) June, 1980.

Illinois State Board of Education. Illinois teacher supply and demand 1977/1978. Springfield, IL: 1978.

Illinois State Board of Education. Illinois teacher supply and demand 1978/1979. Springfield, IL: 1979.

Illinois State Board of Education. Teacher/board collective bargaining information system for Illinois educators: a financial profile of public school districts. Springfield, IL: 1979.

Kleinert, Jack. Teacher turnover in the affluent school district. The Clearing House, 42:5 (January, 1968).

Knight, J. Why vocational agriculture teachers in Ohio leave teaching. Unpublished doctoral dissertation, The Ohio State University, 1979.

Lee, R. D. Relationship of selected demographic characteristics and job satisfaction of industrial arts teachers. Unpublished doctoral dissertation, University of Missouri-Columbia, 1972.

Lindsey, P. W. Teacher turnover in Texas secondary vocational industrial education programs. Unpublished doctoral dissertation, College Station: Texas A & M University, 1979.

Maraviglia, F. A. A unique education. The Journal of Industrial Arts Education. March-April 1969, p. 11.

Maslow, A. H. A theory of human motivation. Psychological Review, 1943, 50, pp. 370-396.

McClean, G. & Moss, J. Replacement need study for vocational-technical teachers in Minnesota: a case study. Journal of Industrial Teacher Education, Spring 1979, pp. 29-38.

McKay, D. Analysis of selected work factors influencing vocational student occu-style. Unpublished doctoral dissertation, University of Missouri-Columbia, 1974.

Miller, D. The national supply of and demand for industrial arts teachers. Unpublished doctoral dissertation, Blacksburg: Virginia Polytechnic Institute and State University, 1979.

Miller, R. Industrial arts teacher supply and demand. Industrial Education, September 1978, pp. 23-25.

Miller, R. Industrial arts teacher supply and demand. Industrial Education, January 1980, pp. 22-23.

Morrison, Donald E. Teachers: better utilization needed. School and Society, 100:2338 (January, 1972).

Musemeche, R. & Adams, S. The coming teacher shortage. Phi Delta Kappan, June, 1978, pp. 691-693.

NASSP. Staff characteristics in large-city high schools. Bulletin of the National Association of Secondary School Principals. 55:351 (January, 1971).

National Education Association, Research Division. Teacher supply and demand in public schools, 1978. Washington, D. C.: National Education Association Research Bulletin, 1978.

National Education Association. Teacher supply and demand in public schools, 1978. Washington, D. C.: 1979.

National Education Association, Research Divison. End of general teacher shortage. Washington, D. C.: National Education Association Research Bulletin. (March, 1971).

National Education Association, Research Division. Teacher separations from service in large school systems. Washington, D. C.: National Education Association Research Bulletin, 49:4 (December, 1971).

National Education Association, Research Division. Teacher supply and demand in public schools, 1970. Washington, D. C.: National Education Association Research Bulletin. (Research Report 1970-R14).

National Education Association, Research Division. Teacher supply and demand in public schools, 1969. (Research Report 1969-R14), Washington, D. C.: National Education Association Research Bulletin, 1969.

National Education Association, Research Division. Teacher mobility and loss. Washington, D. C.: National Education Association Research Bulletin, (December, 1968).

Perkes, Victor A. Correlates of teacher satisfaction in junior high and senior high schools. California Journal of Educational Research, 19:5 (November, 1968).

Pinder, Charles A. and Rieber, Lloyd. Industrial arts teachers. Journal of Industrial Teacher Education, 18:1; 1980, pp. 56-64.

Pontius, David R. An analysis of the cuases and results of position changes by industrial educators. Unpublished doctoral dissertation, Urbana: University of Illinois, 1981.

Project Talent: Progress in Education, a Sample Survey. American Institute of Research, 1971.

Smith, D. F. Serious teacher shortages exist in industrial arts. Man/Society/ Technology, March 1979, pp. 12-15.

Smith, P. C. The Development of a method of measuring job satisfaction; the Cornell studies. In E. Fleishman (Ed.), Studies in Personnel and Industrial Psychology. Homewood, Il. The Dorsey Press, 1967.

Thompson, R. L. The labor market for Illinois community college occupational instructors. Unpublished doctoral dissertation, Urbana: University of Illinois, 1972.

Tomlinson, Robert M. and Kolesar, Joseph. The supply and demand for Vocational-Industrial teachers. Industrial Education 70:1; 1981, pp. 16, 25 & 26.

Tomlinson, Robert M. B. S. graduates in Industrial Education from the state universities in Illinois: 1973-1978. IEIS Report No. 2. Urbana: University of Illinois, Department of Vocational and Technical Education. March 1980.

Tomlinson, Robert M. University of Illinois B. S. graduates in Industrial-Education: 1973-1978. IEIS Report No. 3. Urbana, University of Illinois, Department of Vocational and Technical Education, March, 1980.

U. S. Government Printing Office. The Condition of Education, 1980. Superintendent of Documents: Washington, D. C. 20402 (Report No. 065-000-0000-1-6)

Vroom, V. H. Work and Motivation. New York: Wiley and Sons, Inc. 1964.

Watkins, Beverly T. A 'critical' shortage of school teachers likely by 1985, Education deans warn. Chronicle of Higher Education March 23, 1981; pp 1 & 10.

Wiens, A. E. The characteristics of "mobile" and "stable" occupational educators by specialty and by type of school. Unpublished doctoral dissertation, Urbana: University of Illinois, 1973. (Eric Document Reproducation Service No. ED 085 605).

Wolansky & Nwoke, B. Why the shortage of industrial arts teachers? Voc Ed, February 1980, pp. 26f-26g.

Work In America. Report of a special task force to the Secretary of Health, Education and Welfare. Cambridge: MIT Press, 1973.

Zook, W. Industrial arts teacher shortage. Man/Society/Technology, March 1976, p. 187.

# INDUSTRIAL EDUCATION CODING SYSTEMS

## INDUSTRIAL EDUCATION INFORMATION SYSTEM

### IEIS CODES--IND. ARTS

**GEN. INDUSTRIAL ARTS**

1 Independent Study
2 Career/Voc. Explor.
3 Shop Math
4 Practical Arts
5 American Industries
6 IACP Manufacturing
7 IACP Construction
8 IACP Communication
9 Ind. Orientation
10 Communication Clust.
11 Manufacturing Clust.
12 Mat. & Proc. Cluster
13 Transportation Clust.
14 Energy & Power Clust.
15 Service Cluster
16 Elem. Sch. Ind. Arts
17 Jr. Hi General Shop
18 Sr. Hi General Shop
19 Ag General Shop

**AIR CONDITIONING/HEAT/REFRIG**

**APPLIANCE REPAIR**

**DRAFTING**

20 Drafting General
21 Mech. Drafting I
22 Mech. Drafting II
23 Mech. Drafting III/IV
24 Tech. Draft/Illust.
25 Architectural I
26 Architectural II
27 Engineering Drafting
28 Blueprint
29 Other Drafting

**ELECTRICITY/ELECTRONICS**

30 Electricity I Gen
31 Adv. Electricity II
33 Indust. Electricity
34 House Wiring
35 Electronics I Gen
36 Adv. Electronics II
37 Electronics III/IV/V

**AUTO/POWER/TRANSPORTATION**

40 Auto/Power/Transport.
41 Auto Mechanics
42 Adv. Auto Mechanics
43 Auto Mechanics III
44 Engine Testing
45 Power Mechanics
46 Adv. Power Mech. II
47 Power Mechanics III
48 Small Engine Repair
49 Transportation

**GRAPHIC ARTS/PHOTO**

50 Graphic Arts General
51 Graphic Communicat
52 Visual Communication
53 Adv. Graphic Arts II
54 Offset Printing
55 Photography
57 Book Binding

**AVIATION**

60 Aviation General
61 Aviat Mech. A&P
65 Aviation Flight

### IEIS CODES--VOC./IND.

**AIR CONDITIONING/HEAT/REFRIG**

100 Air Cond./Heat/Refrig.
101 Air Conditioning
102 Heating/Ventilation
104 Refrigeration
109 Oth. Air C/Heat/Refr.

**APPLIANCE REPAIR**

110 Appliance Repair Gen.
111 Elect. Appli. Repair
112 Upholstery
119 Other Appli. Repair

**DRAFTING**

120 Drafting General
121 Mechanical I
122 Mechanical II
123 Mechanical III/IV
124 Tech. Draft/Illust
125 Architectural I
126 Architectural II
127 Architectural III/IV
128 Machine Tool Design
129 Other Drafting

**ELECTRICITY/ELECTRONICS**

130 Electrical General
131 Electrical Occu.
132 Indust. Electrician
133 Other Electrician
134 Electronics General
135 Electronic Occu.
136 Communi. Electronics
137 Indust. Electronics
138 Radio/TV Repair
139 Other Electronic

**AUTO/POWER/TRANSPORTATION**

140 Auto/Power/Diesel
141 Automotive Services
142 Body & Fender
143 Auto Mechanics
144 Auto Tune Up
145 Suspen and Frt End
146 Auto Brakes
147 Diesel Mechanics
148 Small Engine Repair
149 Auto Electronics

**GRAPHIC ARTS/PHOTO**

150 Graphic Arts General
151 Comp./Makeup/Typeset
152 Printshop-Letterpress
154 Offset Printing
155 Photography General
156 Photography Commerc
157 Book Binding
159 Other Graphic Arts

**AVIATION**

160 Aviation General
161 Aircraft Power Plant
162 Airframe Repair & M
163 Aircraft Operations
164 Ground School
165 Aviation Flight
169 Other Aviation

### IEIS CODES--TECH.

**GEN. TECH. FIELDS**

527 Chemical Tech.
554 Fuel Tech.
559 Industrial Tech.
561 Mechanical Tech.
574 Petroleum Tech.
503 Agricultural Tech.
590 Other Technologies

**AIR CONDITIONING/HEAT/REFRIG**

504 Air Conditioning Tech.
506 Air Pollution Tech.
509 Environmental Control Tech.

**APPLIANCE REPAIR**

512 Appliance Repair Tech.

**DRAFTING**

520 Art (Applied) Tech.
515 Arch. Drafting Tech.
518 Archictural Tech.
516 Engineering Graphics

**ELECTRICITY/ELECTRONICS**

540 Electrical Technology
541 Electrical Engineering Tech.
545 Electronic Tech.
542 Electro-Mechanical Tech.

**AUTO/POWER/TRANSPORTATION**

523 Automotive Tech.
553 Fluid Power Tech. (Hyd)
525 Diesel Tech.

**GRAPHIC ARTS/PHOTO**

582 Printing Tech.
576 Photography Tech.

**AVIATION**

510 Aeronautical Technology
502 Comm. Pilot Training

## U.S. OFFICE OF EDUCATION

### OE CODES--VOC/TECH

**GEN TECH. FIELDS**

16.0105 Chemical Tech.
16.0111 Industrial Tech.
16.0113 Mechanical Tech.
16.0116 Petroleum Tech.

**AIR CONDITIONING/HEAT/REFRIG**

16.0110 Environmental Control

**APPLIANCE REPAIR**

17.0200 Appliance Repair

**DRAFTING**

17.1300 Drafting
16.0103 Architectural Tech.

**ELECTRICITY/ELECTRONICS**

16.0107 Electrical Technology
17.1401 Indust. Electrician
16.0108 Electronic Tech.
16.0109 Electro-Mech. Tech.
17.1500 Electronics Occupation
17.1501 Communication
17.1502 Industrial Electronics
17.1503 Radio/Television

**AUTO/POWER/TRANSPORTATION**

16.0104 Automotive Tech.
17.0300 Automotive Services
17.0301 Body and Fender
17.0302 Auto Mechanics
16.0699 Fluid Power Tech. (Hyd)
17.1200 Diesel Mechanic

**GRAPHIC ARTS/PHOTO**

17.1901 Comp./Makeup/Type Set
17.0900 Comm Photo Occ

**AVIATION**

16.0101 Aeronautical Tech.
17.0401 Aircraft Maint. (A&P)
17.0402 Aircraft Operations
16.0601 Commercial Pilot Training

## HIGHER EDUCATION GENERAL INFORMATION SYSTEM

### HEGIS CODES

**GEN TECH. FIELDS**

5305 Chemical Tech.
5304 Fuel Tech.
5312 Industrial Tech.
5315 Mechanical Tech.
5301 Mech. & Engr. Tech. (Gen)

**AIR CONDITIONING/HEAT/REFRIG**

5317 Const. & Bldg. Const. Tech. (Gen)
5408 Environmental Control Tech.

**APPLIANCE REPAIR**

5310 Appliance Repair Tech.

**DRAFTING**

5012 Art (Applied) Tech.
5304 Architectural Drafting Tech.
5303 Engineering Graphics

**ELECTRICITY/ELECTRONICS**

5317 Const. & Bldg. Tech. (Gen)
5301 Elec. Engr. Tech.
5318 Electronics Technology
5311 Electro-Mech. Tech.
5008 Communication Technology

**AUTO/POWER/TRANSPORTATION**

5306 Auto Technology
5307 Diesel Technology

**GRAPHIC ARTS/PHOTO**

5009 Printing Tech.
5007 Photography Tech.
5012 Applied Arts, Gr Arts & PA

**AVIATION**

5302 Aeronautical Tech.
5074 Aircraft Pilot Training

| IRIS CODES--IND. ARTS | IRIS CODES--VOC./IND. | IRIS CODES--TECH. | OE CODES--VOC/TECH | NECIS CODES |
|---|---|---|---|---|
| **PLASTICS/CRAFTS** | **PLASTICS/CRAFTS** | **PLASTICS/CRAFTS** | **PLASTICS/CRAFTS** | **PLASTICS/CRAFTS** |
| 70 Plastics General | 170 Plastics Manuf. Gen | 578 Plastic Tech. | 17.2070 Plastics Manu. | 5305 Plastic Technology |
| 71 Plastics Molding | 171 Plastics Molding | | | |
| 72 Plastic/Fiberg. Lamin. | 172 Plastics/Fiberglass | | | |
| 73 Plastics/Crafts | | | | |
| 74 Other Plastics | 179 Other Plastics | | | |
| 75 Leather | | | | |
| 76 Crafts I | | | | |
| 77 Crafts II | | | | |
| 78 Model Construction | | | | |
| 79 Other Crafts | | | | |
| **METALWORKING** | **METALWORKING** | **METALWORKING** | **METALWORKING** | **METALWORKING** |
| 80 General Metals | 180 Metalworking Gen. | 566 Metalworking Tech. | 17.2304 Metal Trades, Comb. | 5383 Metalworking Tech. |
| 81 Machine Shop | 181 Machine Shop | | | |
| 82 Welding | 182 Welding | 567 Welding Technology | 17.2306 Welding & Cutting | 5308 Welding Technology |
| 83 Foundry/Hot Metals | 183 Foundry | | 17.2301 Foundry | |
| | 184 Machine Tool Oper. | | 17.2303 Machine Tool Operation | |
| | 185 Combined Metal Trade | | 17.2304 Metal Trades, Combined | |
| 86 Sheet Metal | 186 Sheet Metal/Fabricat. | | 17.2305 Sheet Metal Worker | |
| 87 Metals III/IV | | | | 5317 Sheet Metal |
| | 187 Tool & Die Making | | 17.2307 Tool & Die Making | 5383 Metalworking Tech. |
| | 188 Metallurgical Tech. | 563 Metallurgical Tech. | 16.0114 Metallurgical Tech. | 5383 Metalworking Tech. (Gen) |
| 89 Other Metals | 189 Other Metals | 573 Numerical Control Tech. | 16.9908 Numerical Control Tech. | |
| **WOODWORKING** | **CONSTRUCTION & BUILDING TRADES** | **CONSTRUCTION & BUILDING TRADES** | **CONSTRUCTION & BUILDING TRADES** | **CONSTRUCTION & BUILDING TRADES** |
| 90 General Woods | | | | |
| | 191 Masonry | | 17.1004 Masonry | |
| 91 Adv. Wood II | | | | |
| | 192 Plumbing/Pipefitting | | 17.1007 Plumbing & Pipefitting | 5317 Const & Bldg. Tech. (Gen) |
| 92 Wood III/IV | | | | |
| 93 Cabinetmaking | | | 17.3601 Millwork & Cabinetmaking | |
| 94 Cabinet II/Millwork | 194 Cabinet Mak/Millwork | | | |
| 95 Construction | 190 Const/Build Trade G | 535 Const. & Bldg. Tr. Tech. | 17.1000 Construction & Maint. Tr. | 5317 Const. Bldg. Tech. (Gen) |
| 96 Carpentry | 196 Carpentry | | 17.1001 Carpentry | 5317 Const & Bldg. Tech. (Gen) |
| 97 Home Maintenance | | | | |
| | 197 Const. Electricity | | | |
| | 198 Heavy Equip. Oper. | | 17.1003 Heavy Equipment (Con.-Oper) | |
| | 199 Other Construction | 528 Civil Tech. | 16.0106 Civil Tech. | 5309 Civil Tech. |
| 98 Other Woods | | | | |
| 99 Other Ind. Arts | | | | |
| **COMMERCIAL ART** | **COMMERCIAL ART** | **COMMERCIAL ART** | **COMMERCIAL ART** | **COMMERCIAL ART** |
| | 200 Commercial Art | 520 Art (Applied) Tech. | 17.0700 Commercial Artist | 5012 Art (Applied) Tech. |
| | 201 Interior Decorating | | 17.0701 Interior Decorating | |
| | 202 Interior Design | | | |
| | 209 Oth. Appl. Arts/Design | | | |
| **ATOMIC/NUCLEAR** | **ATOMIC/NUCLEAR** | **ATOMIC/NUCLEAR** | **ATOMIC/NUCLEAR** | **ATOMIC/NUCLEAR** |
| | 210 Atomic/Nuclear Gen. | 570 Nuclear Tech. | 16.0115 Nuclear Tech. | 5316 Nuclear Tech. |
| | 211 Indust. Atomic Energy | | | |
| | 212 In/Op/Maint. Reactors | | | |
| | 218 Other Atomic/Nuclear | | | |
| | 220 Business Mach. Repair | | 17.0400 Business Machine Maint. | 5310 Off. Mach. Rep. Tech. |
| **MINING OCCUPATIONS** | **MINING OCCUPATIONS** | **MINING OCCUPATIONS** | **MINING OCCUPATIONS** | **MINING OCCUPATIONS** |
| | 230 Coal Mining Occu | 531 Coal Mining Tech. | 16.0600 Coal Mining Tech. | 5385 Mining Tech. (Gen) |
| | 231 Equipment Maint. | | | |
| | 232 Construction, Mining | | | |
| | 233 Operator | | | 5385 Mining Tech. (Gen) |
| | 234 Other Mining | 530 Mining Tech. (Gen.) | | |
| **INSTRUMENTATION** | **INSTRUMENTATION** | **INSTRUMENTATION** | **INSTRUMENTATION** | **INSTRUMENTATION** |
| | 240 Instrumentation | 560 Instrumentation Tech. | 16.0112 Instrumentation Tech. | 5314 Instrumentation Tech. |
| | 241 Instrument Repair | | | |
| | 242 Watch Repair | | 17.2102 Watchmaking & Repairing | |
| | 243 Other Instrument | 564 Micro-Precision Tech. | | |
| **SUPERV/MANAGEMENT** | **SUPERV/MANAGEMENT** | **SUPERV/MANAGEMENT** | **SUPERV/MANAGEMENT** | **SUPERV/MANAGEMENT** |
| | 250 Foreman/Super/Manage | 555 Industrial Management Tech. | 17.1700 Foremanship/Supv/Mngmt Dev | 5382 Ind'l. Mngmt Tech. |
| | OTHER IE PROGRAMS | | | |
| | 280 Other Voc Programs | | | |
| | 281 Industrial Co-op | | | |
| | 282 Co-op Work Training | | | |
| | 283 WECEP | | | |
| | 284 Interrelated Coop | | | |
| | 285 Ind. Ed./Sp. Needs | | | |
| | **PERSONAL & PUBLIC SERVICE** | **PERSONAL & PUBLIC SERVICE** | **PERSONAL & PUBLIC SERVICE** | **PERSONAL & PUBLIC SERVICE** |
| | 290 Personal & Pub. Serv. | 507 Occ Health & Saftey Tech. | 16.9901 Occ. Health & Safety Tech. | 5006 Personal Serv. Tech. |
| | | | | 5501 Public Serv. Tech. Gen. |
| | 291 Barbering | | 17.2601 Barbering | |
| | 292 Cosmetology | | 17.2602 Cosmetology | 5006 Cosmetologist |
| | 293 Custodial Service | | 17.1100 Custodial Serv. | |
| | 294 Emergency Prepare | | | 5284 Emergency Preparedness |
| | 295 Fire Prevent & Cont | 550 Fire & Safety Tech. | 16.0602 Fire and Safety Tech. | 5507 Fire Science Tech. |
| | | | 17.2801 Fireman Training | |
| | 296 Law Enforcement | 580 Police Science Tech. | 16.0605 Police Science Tech. | |
| | | | 17.2802 Law Enforcement Training | 5505 Police Science Tech. |
| | 297 Other Public Service | | 04.1900 Transportation | 5011 Trans./Pub. Util. Tech. |
| | 299 Other Person/Pub Serv | 508 Water & Waste Water Tech. | | 5501 Pub Service Tech. (Gen.) |

| COMBINED SUBJECT/LAB CODE | | | | ADMINISTRATION--INDUSTRIAL EDUC | | OTHER SUBJECT MATTER | |
|---|---|---|---|---|---|---|---|
| 413 | Trans & Power | 444 | Auto & Welding | 600 | Dept Head Elem/Jr Hi | 701 | Agriculture |
| 420 | Drf & Jr. Gn Shop | 448 | Auto & Metals | 605 | Dept Head Hi School | 703 | Art |
| 421 | Drf & HS Gen Shop | 449 | Power & Woods | 610 | Dept Head AVC | 705 | Bio Science |
| 423 | Draft & Elect | 457 | Graph & Crafts | 615 | Dept Head Comm Coll | 707 | Business Ed |
| 425 | Drft & Gr Arts | 458 | Graph & Metals | 620 | Dept Head Adult Ed | 709 | English |
| 427 | Drft & Crafts | 459 | Graph & Woods | 625 | Dept Head Univ | 711 | Foreign Language |
| 428 | Drft & Metals | 479 | Plast & Woods | 630 | Bldg Sup Elem/Jr Hi | 713 | Home Economics |
| 429 | Drft & Woods | 480 | Metals & Agr | 635 | Bldg Sup Hi School | 715 | Mathematics |
| 432 | Elect & Su Eng | 481 | Metal & Power | 640 | Director AVC | 717 | PE |
| 433 | Elect & Electron | 487 | Metals & Plst | 645 | Asst Director AVC | 719 | Physical Science |
| 434 | Elect & Auto | 489 | Metals & Woods | 650 | Bldg Sup Adult Ed | 721 | Social Studies |
| 435 | Elect. & Gr Arts | 490 | Metals & Agr | 655 | Comm Col Director | 723 | Health Occ. |
| 438 | Elect. & Metals | 496 | Woods & Crafts | 660 | Comm Col Asst Dir | | |
| 439 | Elect. & Woods | 497 | Wds & Carpent | 665 | District Director | | |
| 443 | Auto & Su Eng | 499 | Woods & Mfg | 670 | District Asst Dir | | |